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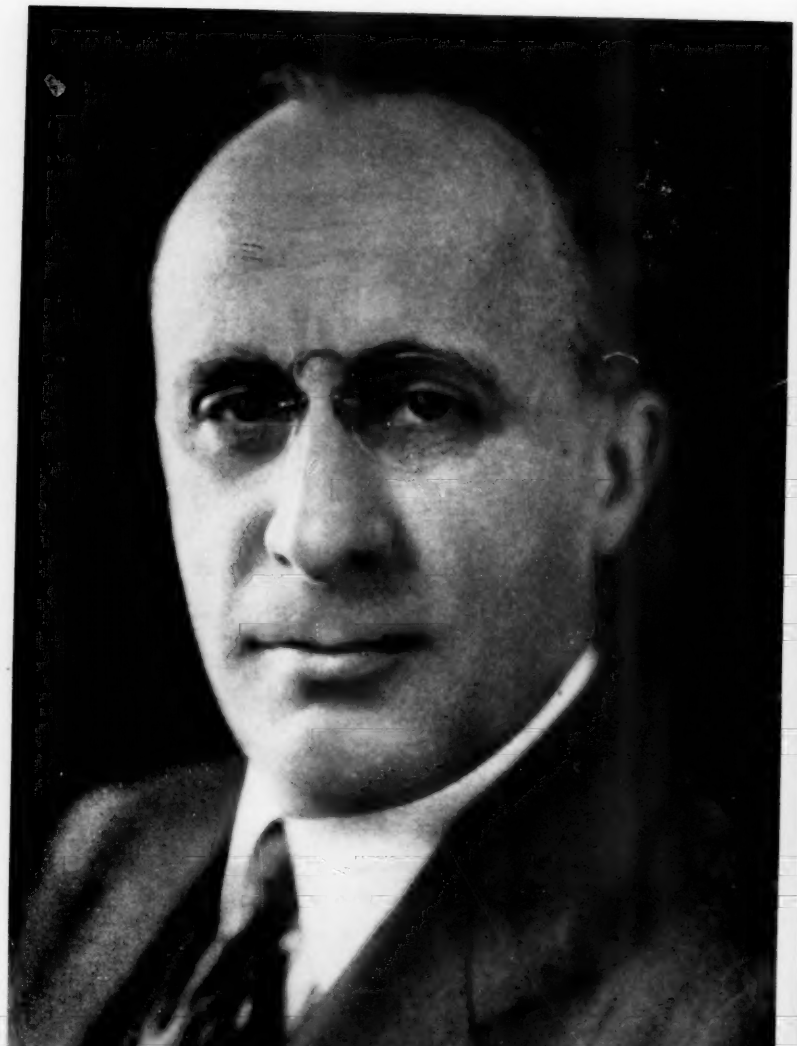

Clarence D. Chesney

UNIV. OF MICH.

PRESIDENTIAL ADDRESS.

Past, Present and Future Problems in Psychiatry.*

By CLARENCE O. CHENEY, M. D., New York, N. Y.

It so happens that within a few weeks I shall have completed a period of 25 years in psychiatry. In contemplating matters which I might discuss with you this morning it seemed that I might choose to reminisce a bit, to discuss present conditions, and also to look into the future. However, before doing so, it seemed of interest to me, and I thought it might be to you, to go back another quarter century or to 50 years ago and glance at what psychiatry, as represented by this Association, was concerned with.

In 1886 the tenth meeting of the "Association of Medical Superintendents of American Institutions for the Insane," as this Association was then designated, was held in Lexington, Kentucky. The complete attendance of members numbered 39. The proceedings record that the first afternoon was spent in a reception to the members—it is not described but it is pleasant to imagine. There was also an "old fashioned" barbecue, and the committee on arrangements had planned a special horse race for one afternoon, but the arrangements did not materialize and the Association visited instead, "Major McDowell's Stock Farm and the Treacy Stud Farm." As one reads the report of this meeting 50 years ago one senses the genial hospitality and the freedom from the pressure of attending many sections and sessions and of concentrating on many papers. However, the meeting was not altogether one of mere pleasure. One speaker, discussing the treatment of the insane, referred to them as "A class which is rapidly growing, probably owing to the characteristically fast age in which we live, perhaps because of the overstrained nervous and physical condition of our rapidly rushing people." This, be it noted, was 50 years ago in Kentucky. Attention was called to the large proportion of foreign-born and children of foreign-born parents in the public insane

* Delivered at the ninety-second annual meeting of The American Psychiatric Association in St. Louis, May 5, 1936.

institutions; this was ascribed to the "practice by European countries of sending its paupers and criminals to the United States" and a strong plea was made that to eliminate this practice "expert examiners should be attached to every consular office in Europe and Asia" to examine prospective immigrants to have the latter demonstrate that they had never been paupers, insane or convicted of crime. It is unnecessary to recall that only a few years ago this procedure was instituted that had been thus advocated by the Association 50 years ago. The president, Dr. Orpheus Everts, in his address on common errors relating to insanity, pointed out the following beliefs that he considered erroneous: the belief that insanity was a disease of the mind rather than the brain; the belief that insanity had a single cause in an individual, rather than a "conspiracy of causes"; the belief that symptoms were causes, *e. g.,* religious excitement; and the belief that there was such an entity as "moral insanity." His closing sentence is interesting and as appropriate today as 50 years ago; *viz.,* ". . . . it is more reasonable to suppose that individual observers of exceptional phenomena may be mistaken as to facts or appearances, than that nature is erratic, or than that truth is incongruous."

At this meeting there was a prolonged discussion on the training of nurses, the first class having then been recently graduated from the Buffalo State Hospital. Problems of unlocked doors, open wards, and parole of patients were also discussed in a lively manner and the abolition of restraint was indicated.

Perhaps of most interest to us today, because of our conceptions of the cause and treatment of general paresis, is the paper by Dr. Hurd on "The Relation of General Paresis and Syphilitic Insanity." The clinical pictures of general paresis were described minutely, and the brain changes were enumerated but were not looked upon as pathognomic, inasmuch as similar changes are found "in other forms of chronic brain disease." "They seem to be the result of hyperaemias, increased blood circulation, over-action and over-excitation of motor areas; and are degenerations of the cell elements and the *débris* of exhausted brain tissues." Dr. Hurd expressed the opinion that the disease was due to some cause which "at first acts as an irritant upon the grey matter of the frontal and parietal convolutions, producing excitement and afterwards exhaustion and decay." Syphilis was not considered a cause.

" Syphilitic insanity " or insanity due to brain syphilis was described quite separately, and was subdivided into (1) simple psychosis, " from the direct toxic influence of the disease in the brain "; (2) " Gross brain lesions " with " syphilomata or gummatous tumors," (3) " disease of arteries of brain from syphilitic deposits "; (4) " congestive form of cerebral syphilis," this last with brain changes " in no respect different from the pathological appearance of general paresis " but with clinical differences, particularly in that the " delusions of grandeur are not as extravagant or persistent [as in general paresis] and delusions of fear and apprehension are sometimes present." Particularly of interest in view of the modern fever treatment of general paresis are the references by Dr. Hurd to patients apparently cured or much benefited after accidental fevers; one a man who, following a burn of his heel, had an extensive slough, another who had smallpox, and several others who had had severe carbuncles. Dr. Hurd concluded: " I am of the opinion that if we knew where to make the slough and when, and how near we could go to death in such heroic treatment of our patients, we might secure some recoveries from paresis." Thus was the subsequent work of Wagner-Jauregg forecast.

I have tried to draw a sketch of the meeting 50 years ago to convey something of the impression which a full reading of the proceedings gives of the earnest interest, the careful observation and thoughtful consideration shown in, and given to, the problems of the day that our predecessors were working with and trying to solve—with a spirit and intelligence that is not surpassed today. Our increased knowledge and the improved tools we have to work with are to our advantage, but there were as keen minds in those days, and the reading of these and other proceedings of many years ago is commended to those who, having appeared many years later on the scene, are unfamiliar with what this Association has worked for and thought about through its existence, and who consequently feel at times that the old can well be forgotten and discarded and that only the new with which we are familiar is worth while.

I have said that 50 years ago there was discussion of the increase of insanity. Twenty-five years ago Dr. Charles Pilgrim in his presidential address before the Association called attention to the

fact that during the previous 20 years the number of patients in the New York State institutions had increased by 104 per cent while the population had increased only 52 per cent. And we can say that in the last 22 years the number of patients in the New York civil state hospitals increased 87 per cent. The increase per 100,000 population however was only 27 per cent. This increase in the patient population has been principally in the old age groups, that is, the arteriosclerotic and senile types, and is due in a part at least, we believe, to the increase in duration of life, 10 years having been added to the average life span since 1900. The longer a person lives the more chance there is of developing mental disorder requiring hospital care. I have previously paraphrased the well known biblical statement into "What shall it profit a man if he adds 10 years to his life and thereby loses his mind?"

Just as an increase in general hospital facilities is followed by increased admission rates to such hospitals, so increase in mental hospital facilities is followed by increased admissions for mental illness. Increasing familiarity with mental hospital care and its possibilities, changes in economic conditions, and increase of urban over rural population are all factors, we believe, that increase mental hospital admissions. Such an increased admission rate does not mean a corresponding increase in mental disorder. We know of no figures that accurately give the actual incidence of mental disorder. Although one might logically arrive at the conclusion that an increase in the stress and strain of living might promote mental disorder, we know of no actual facts to substantiate such an assumption. We have pointed out that 50 years ago the increased rate of living was charged as a cause of the increase of insanity. But this concern about the increase of nervous disorders was not a new concern then. In a volume entitled "The English Malady; or a Treatise of Nervous Diseases of all Kinds" by Dr. George Cheyne, published in London in 1734, one finds a chapter on "The Frequency of Nervous Disorders, in later Years, beyond what they have been in former Times" and he ascribed the increase as follows: "Since our wealth has increased, and our Navigation has been extended, we have ransack'd all the Parts of the *Globe* to bring together its whole stock of materials for *Riot, Luxury,* and to provoke *Excess.*" The figures of hospital admissions compiled the past few years during the period of economic depression, do

not indicate definitely that there has been a resulting increase in mental illness requiring hospitalization. Such evidence substantiates one's belief that except for certain types brought about by somatic or brain disease, mental illness arises within the person and is not necessarily brought about by external factors.

As psychiatric hospitals and the patients in them have increased during the past 25 years, there has been an increasing need and demand for physicians to care for them. This increase has been reflected in part by the increase in the membership of this Association. Whereas in 1911 the membership numbered 496, this year it numbers 1676, more than a three-fold increase, this in spite of the fact that particularly during the past few years the requirements for admission to the Association have been materially raised in respect to necessary training and experience. Also, whereas 25 years ago the great majority of members of this Association were practicing in institutions, during the past few years there has been an increasing membership made up of those who are practicing outside of institutions. This is one example of the evidence that psychiatry has become and is becoming more and more concerned with extra-institutional treatment.

The Association, however, recognizes the importance, and in fact the necessity, of psychiatric hospital training for the building of a proper foundation for psychiatric practice. In no better way than in a properly organized hospital can the recent graduate attain that basic training and broad experience which is required to meet properly the problems he will encounter in the community. Mere interest in psychiatry and the occasional observation of how other people work, and a reading knowledge of the experience of others can by no means take the place of actual concrete experience with clinical material met in hospital practice and seen in long section. There is increasing need for well trained psychiatrists and one has good reason to believe that this need will keep increasing for some time to come. At the present this need, although met better that it was 25 years ago, is not being met to the satisfaction of those of us who are concerned with finding proper men in hospital, clinic and community positions. The stimulation of interest to fulfill these needs and guide men into psychiatry must come from at least two sources, proper and desirable medical education in psychiatry and increased opportunities for good training in mental hospitals.

Some 25 years ago my medical education in psychiatry consisted of about 15 lectures and clinical demonstrations of patients who were brought from a nearby large psychiatric hospital, the demonstrations being made by a man who had little familiarity with the particular patients and the course making an impression more of the dramatic than of the educational. Little of a helpful impression was left by such a course and certainly no incentive was aroused to become further interested in psychiatry by such a course. It was entirely through other influences that I happened to enter the field of psychiatry, and a classmate and I who were the only ones entering such a field were looked at somewhat askance by the other members of the class who were primarily concerned in practicing surgery or internal medicine. There had been no opportunity afforded to actually come in contact with psychiatric patients and there was little, if any, attempt to inform students of the application of psychiatric problems in general medicine. Although a survey of psychiatric education carried out by a special committee of the National Committee for Mental Hygiene has demonstrated a marked improvement in the educational psychiatric facilities in the medical schools during the past several years, it is unfortunately too true that the methods of medical education in psychiatry remain in some medical schools as they generally existed 25 years ago and it is felt that in such schools there may be little incentive to the graduate to enter psychiatry as his field of work nor is there any emphasis on the psychiatric implications in general medical practice.

However, the situation is different in some other medical schools and particularly in the one with which we happen to be connected. There, particularly because of readily available hospital and clinic facilities, the students have an introductory course in psychopathology in the second year, and a period of 10 weeks' clerkship in psychiatry during the third year so that, under guidance and supervision, they come actually in contact with the problems of individual patients and have an opportunity of working out those problems, thus gaining experience which it is expected they will apply in the future, whether or not they enter psychiatry as their major work. Also a gratifying proportion of students show an interest in gaining further training and experience as they realize more and more the importance of a psychiatric viewpoint in general practice. The students also have an opportunity during their

medical clerkships in the general hospital to refer and discuss their cases with psychiatrists in the department of psychiatry who are assigned to the medical services. These psychiatrists have an office on the medical service. Psychiatry, therefore, becomes a part of medicine and is not set apart from medicine as is the tendency where only patients who have been committed to psychiatric hospitals are seen as psychiatric problems by the medical students. Although psychiatric teaching hospital facilities may not be readily available to all medical schools, psychiatric medical education can be advanced materially if well trained psychiatrists become members of the staffs of the general hospitals in medicine, surgery and pediatrics particularly so that the students may become informed of the importance of the recognition and treatment of personality problems and emotional difficulties to be seen and treated in any type of illness. The assimilation of psychiatrists on general hospital staffs is not by any means always an easy one. It has been our conception that before a psychiatrist can be accepted on a medical, surgical or pediatric service as one of the staff he should obviously have had a competent training in the respective branch of medicine to which he is assigned to work, to make him acceptable to the general hospital department, so that the general hospital staff will not be placed on the defensive against him and also so that the psychiatrist on his part may be well coordinated and secure in his knowledge of the branch of medicine in which he is working. One cannot carry out hard and fast rules about the placing of psychiatrists in general hospitals. The personal equation is still a strong one and there are many psychological factors that have to be considered to bring about a harmonious coordination in psychiatric and other medical work.

We look forward to the time when the medical student, having had a desirable training in psychiatry during his medical course and having continued his training during his general hospital interneship, will be much better prepared than he generally is now to handle psychiatric problems that he meets in general practice, and we hope that as a result of such proper training, more mentally ill persons may be recognized and properly treated than at the present time and that the present mental hospital admissions may be decreased in number. I have the feeling that as the psychiatric viewpoint and training pervades medicine and the general hospitals,

there will be an increased development of psychiatric care in the general hospitals and that therefore there will tend to be a decentralization from state hospital care to local general hospitals. This may be one solution of the increased burden of state budgets. Furthermore, as physicians become better versed in the treatment of psychiatric problems in general practice there may be a decreasing tendency to send psychiatric patients immediately to state hospitals, and more of an inclination to care for them in their homes, under private or clinic medical supervision, public health nursing and social service care. However, we do not attempt to deny that there will probably always be patients requiring prolonged psychiatric hospital care, those patients who, from the standpoint of recovery are "inoperable." For these comfortable care is indicated. We have previously taken a stand against the establishment of custodial hospitals for the incurable because of the stultifying effects on the whole hospital personnel of having only "hopeless" cases to care for, but if it eventually developed that the state hospitals become essentially hospitals for the chronic patient, the medical staffs could have their interests maintained and stimulated by giving a fair share of their time to the more hopeful work in community adult and children's clinics.

Such a development in general hospital and state hospital care may never eventuate and if it does it may be a long time in coming. Meanwhile, the second source of training of good psychiatrists should and must be utilized and developed—the training in the public psychiatric hospitals. In many of the hospitals, because of the large variety of clinical material there is an unlimited possibility for good clinical training. It is often a question of organization of facilities for such training. A resident will learn something of course by daily routine duties, but will learn much more if he is given systematic instruction in psychopathology and clinical psychiatry and has his work planned and supervised by a clinical director, or some other qualified member of the staff, who is given the responsibility of carrying out that function. If 50 per cent of the patients admitted to state hospitals are suffering from organic brain diseases, there is an excellent opportunity for training in neurological examination, diagnosis and treatment. This calls for a leader trained in neurology so that this opportunity will not be neglected. Further, the mental hospitals with their laboratories and

pathologists, have an opportunity for training in neuroanatomy and neuropathology—too often it seems, this aspect may be overlooked and opportunities not taken advantage of. No psychiatrist is well trained without having some knowledge, and actual special training in these basic branches. It is disconcerting to have psychiatrists of 15 or more years of experience in mental hospitals demonstrate on examination that they cannot distinguish the cerebellum from the pons, or be quite at a loss to distinguish an upper motor neuron syndrome from a lower motor neuron syndrome, or to show evidence of no knowledge of the brain changes in arteriosclerosis or general paresis. It is hoped that the American Board of Psychiatry and Neurology will, because of its insistence on basic training as well as in the clinical branches, stimulate the hospitals to organize those facilities which they now have, so that they will be recognized as training centers. The younger men coming up for examination in the future will be held to these requirements more strictly than the older graduates have been and it is expected that the better hospitals will be more and more recognized and will attract desirable men to their staffs, while those hospitals without a training program will be avoided and therefore have difficulty in properly filling their staff positions.

More than 25 years ago through the kindly offices of my good friend, Dr. Brill, I became a charter member of the New York Psychoanalytic Society before I was graduated in medicine. I recall vividly some of the personalities of that group and their differences of opinion but do not recall so distinctly what they discussed. A few years later in reorganization, I withdrew and since that time I have been as it were, standing on the side lines, watching the progress, if it be that, of psychoanalysis. One who has gone through these years in psychiatry has appreciated the contributions of Freud to psychopathology and the understanding of symptoms and reactions. It has been of interest to observe and work with those physicians who have been particularly devoted to psychoanalysis. It has been a pleasure to work with those who seemed to have been influenced in their balance by their previous sound psychiatric training but one has viewed with some concern those who without such basic training have seized upon psychoanalysis as something that apparently for personal reasons has appealed strongly to them to the exclusion of other psychiatric interests,

sometimes apparently driven by the desire to aggrandize their own personalities by being different from the psychiatrist and at times seeming to out-Herod Herod. One has wondered whether the father of psychoanalysis would be proud of some of his disciples. One has watched with interest the attraction that the philosophical aspects of psychoanalysis have seemed to have for some physicians, particularly those who apparently do not feel drawn to medicine and to whom "being a good doctor" does not appeal. It has seemed doubtful at times whether those who refused to make physical examinations of patients were carrying out the practice of medicine. But one supposes that such conception would appeal to those who might be more interested in philosophical formulations than in concrete helpfulness. Because of our experience with some of the more recent graduates in medicine who leaped into psychoanalysis before receiving basic training in objective psychopathology and clinical psychiatry, we have more recently required that our residents have at least a year of such fundamental experience before undertaking a training analysis. Psychoanalysis is to the mind what anatomy and histology are to the body; but advances in therapeusis are not necessarily related to those in anatomy or histology. It is to be regretted, of course, that the public, attracted by lay as well as medical literature on psychoanalysis has come to assume that psychoanalysis is the only therapeutic measure for psychiatric disorders, the term often being used however, without consideration of the meaning. However, such an over-valuation of new medical procedures has occurred in the past and it is to be expected that eventually, as in other disciplines, the truth will prevail and that sound conceptions will predominate. We are glad to call attention again to the illuminating discussion on psychoanalysis by our President, Dr. Kirby two years ago. A re-reading of this address is commended to the members of this Association. I quote a paragraph from that address, which I believe cannot be improved upon as representing a desirable viewpoint:

> Just as psychiatry has been influenced by psychoanalysis so I believe will the therapeutic technique of analysis be modified by increasing psychiatric knowledge and improved methods. Already the limits of the "orthodox analysis" in case work are recognized and need is felt for what analysts themselves call a "modified technique." I believe that psychoanalysis has been burdened by too much formalism, too much dogmatism, and too much

appearance of cultism. The rigidity and ritualism which it now uses in therapeutic technique represent a phase which I believe will gradually pass away.

Some 25 years ago there was little, if any, after-care to follow up patients who were discharged from mental hospitals. This pertained to New York State and to my best knowledge applied to the other states at that time. In 1905 and 1906 the state hospital authorities had their attention called to the desirability of such after-care, particularly to prevent relapses. Interestingly enough, however, in view of our present conception, it was not felt at that time that such after-care of patients was one of the functions or responsibilities of a state institution, and a private organization, the State Charities Aid Association, undertook to establish a system of after-care. It was not until 1912 that the state hospital physicians were assigned to clinics for after-care and prophylaxis in New York City and it was not until 1913 that the so-called insanity law of the state was amended so as to authorize state hospital superintendents to establish out-patient departments and clinics with field agents. Up to 1911 only four such clinics had been established. The first suggestion in 1909 that a community clinic be held at one of the state hospitals was met by opposition on the ground that such clinics were not the function of the hospitals. However, the opposition was overcome and the first regular clinic was established at the St. Lawrence State Hospital by Dr. Hutchings in 1909. Twenty-five years have passed and the situation is different. In New York State largely because of our change of conceptions of the functions of state hospitals, in the Department of Mental Hygiene there were in 1934, 70 clinics manned by state hospital personnel and at these clinics during the last year 6802 patients were seen and 1327 persons other than patients were advised. In addition to the state hospital clinics the Department of Mental Hygiene maintained 162 child guidance clinics at which during 1934 more than 4500 children were examined. New York State has accomplished this through constant effort and some other states have developed their facilities correspondingly but it is felt that even at present there are many states in this country which have inadequate facilities for community activities in the way of community clinics or even parole clinics attended by state hospital physicians and social workers. Experience has well shown the

benefit to be derived from assistance and aid given to patients leaving mental hospitals by properly trained, understanding social workers and hospital physicians detailed to community work, and it is hoped that in the not far distant future those states that do not have such facilities either because of lack of appreciation of their desirability or because of lack of funds to maintain them, will see to it that the persons in their states receive that consideration and care which not only will relieve the ultimate burden to the states but to which the residents of those states are entitled as a matter of public health. We should have gotten by this time beyond any doubt as to the undesirability of turning patients out of the hospitals to shift for themselves or to try to get along under undesirable circumstances in which they previously lived. Even in New York State where it may be conceded that there is a fair attempt at proper social work and after-care a recent survey and discussion of community clinics with those who have been doing the work for the last few years, has brought to the fore the still present need of additional personnel to keep in contact with the patients after they leave the hospitals in such a manner as to help them from return. Merely from the economic side it is good business to provide salaries for the necessary social workers and physicians to help patients leaving the hospital to adjust so that they will not have to return.

Twenty-five years ago Dr. Pilgrim indicated in his presidential address that as far as New York State was concerned, " intelligent nursing is now the rule " in the state hospitals. Probably nobody will deny that in the past 25 years the nursing of the mentally ill has improved at least in the better organized hospitals. Educational requirements for entrance into the training schools have been raised so that, for example in New York State, only those who have been graduated from high schools are acceptable. Curricula have been materially altered so that nurses receive much more training in the basic sciences. In fact, criticism of nursing curricula is not infrequently heard, to the effect that attempts are being made to " make doctors " of nurses. Such comments are by no means new. They were made when the first training schools were organized in this country and when the first attempts were made to set up standards for training. However, the question of whether psychiatric hospitals shall maintain training schools primarily for

educational purposes or for the proper care of the patients is not easy to answer. Perhaps the best reply is " both." It may be taken for granted that within certain limits the more educational advantages a nurse has and the better training, the better care she can give to the sick. We must confess at the present moment that we are not able to formulate definitely the limits to which those educational advantages should go. Nurses, perhaps naturally, are keenly interested in raising the standards of the profession to which they belong and the psychological factors operative in such a situation are obvious. We feel that in medicine in the long run, the better preliminary education a physician has, the better equipped he will be to practice medicine, and perhaps the same formulation can profitably be applied to nursing education. There are, of course, exceptions in medicine and it would not be surprising if there were exceptions in nursing; that is, in some instances, the nurse who had had, presumably, better educational advantages, does not necessarily make the best nurse. Whether or not psychiatric hospitals can continue to maintain training schools for nurses to the best advantage is also a present day problem. In some hospitals undoubtedly the training facilities and supervision are not as good as might be obtained in a general hospital. The solution to that problem is the building up and maintaining of proper training standards in the hospitals that do not now have them. In the large and moderately sized psychiatric hospitals it would appear that there is sufficient bedside nursing available for the proper training of undergraduates but it is conceivable that in some of the smaller psychiatric hospitals who select their patients and do not therefore have a wide variety of acute and chronic physical ailments for bedside nursing, general undergraduate training might be left to the general hospital and that the very proper function of the psychiatric hospital to carry out affiliation for psychiatric nursing and for post-graduate training of general hospital graduates could be exercised to better advantage. I presume nobody would deny the beneficial influence in a psychiatric hospital of some educational activities for nurses whether they be undergraduates or post-graduates, because of the resulting improvement in the standards of care of patients. It is perhaps unnecessary to say that we advocate most strongly the infiltration throughout any psychiatric hospital of properly trained nurses rather than untrained attendants for the proper care af the patients.

Twenty-five years ago the assignment of women nurses to male patients wards was somewhat of an innovation and the exception. Unfortunately still, we feel, there is often too little of female nursing on male wards. Our own experience leads us to minimize the objections frequently raised to such a procedure by those who have not had the experience. It is our very definite feeling that there are few, if any, wards in a mental hospital that cannot properly have women nurses, with a resulting elevation of the morale of such wards. The catastrophes feared by those who have not gone through such an experience, do not materialize in actual practice.

In his presidential address 25 years ago, Dr. Pilgrim pointed out that in New York State civil service laws prevailed in the appointment of medical officers and other personnel and political influence had no weight whatever in appointments or promotions. It is gratifying to be able to say that that situation has prevailed through my experience in the past 25 years. It has contributed materially to my own morale and of those with whom I have been associated and whom I have appointed, that I have never had during the 25 years to make an appointment of any person in a hospital for partisan, political reasons and it is difficult to evaluate the benefits to morale of such a situation. I have been able to imagine no more demoralizing influence in psychiatric hospitals than to have appointments made or persons removed from service because of politics, and my sympathy is with those who have been less fortunate and who have been coerced into making such appointments or removals. To have the decision made merely on the ground of politics or party affiliation, as to who is to care for the mentally ill is in our opinion little short of criminal. We do not wish to seem too harsh but at the same time we say with a strong conviction that if there is no other way for politicians to learn to keep politics out of psychiatric hospitals, then we can only wish for them that they or their own families, visited by mental illness, would be placed in charge of those untrained, uninformed persons who had come to such a position of authority through political means. Then perhaps they would see the light and know that decent care of the mentally ill who have no votes and cannot speak for themselves is one of the prime functions of government, requiring experience and training no less than decency in those responsible for that care and that

whoever has no realization of such principles is unfit to represent even the lowliest in the community.

I have attempted to outline briefly a few of the many problems in which we have been interested in the past and which will continue to be of concern to us in the future. Psychiatry on this continent, largely represented by the members of this Association, has made progress and will continue to do so but the advances may at times be slow and laborious. The problems in psychiatry cannot be solved by a miracle or by an all-inclusive discovery. It is a human tendency to seek an easy, simple explanation of all that is unknown but we as psychiatrists and others who are working in psychiatric fields, should not be discouraged or stampeded into a feeling of inadequacy by uninformed persons who are controlled only by wishful thinking and who expect a satisfying answer to all questions that they themselves are loathe to study and work with. It is fortunate that one can see some problems and work toward their solution. Psychiatry therefore is not static and stultifying. We shall continue to work with a careful observation of facts, altering our conceptions as the facts warrant and looking to the final drawing of conclusions which are sound.

We of the present have been influenced and guided by the work of our predecessors and we hope that those who come after us may be benefited by our efforts and may be able to continue beyond the point which we have been able to reach in our work.

As we pay our respects to the accomplishments of those who have gone from us in the past we give our blessing to those who will follow us in the future and Godspeed to them in the accomplishments which we anticipate for them.

CLARENCE O. CHENEY, M. D.,

President, 1935-36.

A Biographical Sketch.

By LELAND E. HINSIE.

It is a pleasant assignment to record a biographical sketch of an individual who has achieved eminence at a comparatively early age and at a period of his career when he is preparing to continue his activities with added zeal and enthusiasm. The pleasure lies in the consideration that the accomplishments of his past have more than intrinsic value; they constitute the foundation upon which a substantial superstructure may be erected. This biography is in the nature of an inventory, taken at the height of a busy season.

Dr. Clarence Orion Cheney was born in Poughkeepsie, N. Y., July 10, 1887. His lineage on American soil has been traced back to the year 1635, when John Cheney left England with his wife and four children to settle in Roxbury, Mass. The direct line of descent from the paternal ancestor comprises nine generations of which Clarence O. Cheney is the ninth.

Upon the completion of his elementary and high school education in Poughkeepsie, N. Y., Dr. Cheney entered Columbia College in New York City from which he was graduated in 1908 with the degree of Bachelor of Arts. He had had the study of medicine in mind during his undergraduate years and towards that end he pursued medical studies at the College of Physicians and Surgeons, Columbia University, from which he was graduated in 1911. His medical interests turned early in the direction of psychiatry. Following graduation he became a member of the staff of the Manhattan State Hospital, engaging in clinical work from 1911-1912. He was pathologist at the same hospital from 1913-1917. It was characteristic of Dr. Cheney, from the beginning of his medical career, to acquire broad training and experience and he has since continued with the same attitude.

When he came under the influence of Dr. George H. Kirby in 1917 he was due to perpetuate the same breadth of interests that

he had shown in earlier years. He enlarged his interests in the organic and psychical aspects of psychiatry and began to publish the results of his research activities. The clinical and administrative experiences that he had gained while he was chief of the psychiatric clinic at the Cornell University Medical College attested to the variety of his aptitudes. Teaching was added to the foregoing activities. During the collegiate years 1917-18 and 1918-19 Dr. Cheney was instructor in psychiatry at the University and Bellevue Hospital Medical College. He had begun his teaching career at the Cornell University Medical College in 1917, resigning therefrom in 1922, when he left New York City.

In 1915 Dr. Cheney married Miss Josephine Scott. They have a son, Robert, now in his late 'teens. Those of us who have had the pleasure of knowing Mrs. Cheney and Bob are aware of the informal amenities which characterize both of them. I believe that the members of his family have been directly responsible for a measure of Dr. Cheney's success. In virtue of their inherent qualities they create a wholesome, helpful attitude.

Dr. Cheney was assistant director of the Psychiatric Institute from 1917 to 1922. While there he acquired extensive clinical, teaching and administrative experiences. During that period he published several papers of a clinical research character, taught psychiatry to graduate and undergraduate students and assisted Dr. Kirby in the administration of the Psychiatric Institute.

In 1922 he was offered and accepted the position of assistant superintendent of the Utica State Hospital, Utica, N. Y. In this new position Dr. Cheney's general interests did not vary to any appreciable extent, save that his administrative assignments were considerably enlarged. While he was in Utica he was instructor in psychiatry at the Syracuse University College of Medicine. He also continued, during that period (1922-26) to publish papers of psychiatric interest, the majority of his publications at that time centering upon the relationship of psychiatry to the community.

Dr. Cheney was superintendent of the Hudson River State Hospital, Pougkeepsie, N. Y., from 1926 to 1931. There he instituted many progressive measures in matters of psychiatric treatment and research, as well as of administration. He carried the same progressive spirit into the community and during his administration there was a steady increase in the relationship between

the hospital and community interests. He established closer contacts with the general medical profession through his activities as consultant psychiatrist to the Vassar Brothers Hospital and to St. Francis Hospital, both in Poughkeepsie. In 1931 he was president of the Dutchess-Putnam County Medical Society.

These varied experiences, supported to be sure by unusual aptitudes, led to his appointment in 1931 as director of the New York State Psychiatric Institute and Hospital and professor of psychiatry at the College of Physicians and Surgeons, Columbia University. I know that Dr. Cheney was proud of his new positions, not only because of the honor associated with them, but because he was returning to the Institute that he had left less than a decade before. Also, he was to head the department of psychiatry in his alma mater. He received the honors with modesty; indeed, only those close to him were aware of the happiness that the esteem of his colleagues had created in him. Dr. Cheney has always had the unique faculty of registering pleasure by the sincerity with which he carries out his responsibilities. It is devotion to his work, not words, that give answer to his appreciation. It has been so for the 16 years that I have known him.

Dr. Cheney successfully carried out the policies of teaching and research that had been laid down by his predecessor, Dr. Kirby; and he amplified them to a degree that gained the admiration of his associates.

He was a director of teaching and of research. But he was also a leader in a larger field, that of American psychiatry. He was secretary-treasurer of The American Psychiatric Association from 1928 to 1933 and he was president of the Association for the year 1935-36. In these capacities he assisted in the establishment of policies that served to elevate the standards of American psychiatry. As Chairman of the Board of Examiners of The American Psychiatric Association and as a member of the American Board of Psychiatry and Neurology, Inc., he was in a position to participate still further in the advancement of psychiatric interests.

In June of this year Dr. Cheney completed 25 years of continuous service in the Department of Mental Hygiene, New York State. He was eligible for retirement, only, however, on the basis of a pension system. He was 48 years old when he elected to relinquish the formal titles that he then possessed and to carry on

his interests from a different vantage point. His impulses will not change in virtue of location; in fact, the setting to which he is now applying his resources—Bloomingdale Hospital, White Plains, N. Y.—is not essentially different from that to which he had been accustomed over the previous years. We may expect to feel his influences in the future, perhaps to an even greater extent than we have in the past. I know that he intends to continue his research activities in conjunction with his duties as medical director of Bloomingdale Hospital.

It is perhaps quite unnecessary to mention the many organizations in which Dr. Cheney holds membership and of many of which he has been an officer. He has membership in national, state and local psychiatric societies; membership in public welfare organizations, in a college fraternity and in an honorary scientific society, Kappa Chapter of Sigma Xi. His counsel is available on many important boards associated with psychiatry and its allied interests.

SIGMUND FREUD—HIS WORK AND INFLUENCE.*

By C. P. OBERNDORF, M. D., New York City.

Through a fortunate though fortuitous selection of the date for this meeting, this sixth of May, 1936, is the 80th anniversary of the birth of Sigmund Freud. Similar exercises in celebration of this event may be taking place not only in St. Louis but in Tokyo, half-way around the world, in Oslo, as well as in Bombay. This vast territorial distribution alone would not be indicative of the nature of the spread of interest in the work of this great Viennese physician. Other men in their life-time, but few at the age of 80, have received similar honors from peers in their own field in far scattered centers of learning. But the groups which today gather to honor Freud in these widely separated lands are composed of leaders of thought in medicine, literature, philosophy and law, in all of which psychoanalysis has become an influential force, and particularly in psychiatry where its effect has been revolutionizing.

The words, Freud and psychoanalysis, have become practically synonymous, for psychoanalytic theory in its development is an uniquely individual product of the genius of one man. Just as it is impossible to dissociate the words, Freud and psychoanalysis, so, too, is it impossible to dissociate the heritage, the personality and the time of Freud from his achievements.

Freud's vivid autobiography portrays intimately the strong emotional forces which have inevitably inspired and colored his work. Suffice it to say that his medical training was formal and academic, that his early investigations in the neuro-anatomical laboratory and his clinical papers on birth palsies in children and aphasia are ample evidence that had his talents been devoted to this type of study he would have achieved an honored position in more conservative medical fields. The idea of applying the anesthetic properties of the newly discovered drug, cocaine, to the

*Address read at a joint session of the American Psychoanalytic Association and The American Psychiatric Association at the ninety-second annual meeting of The American Psychiatric Association, St. Louis, Missouri, May 4-8, 1936.

cornea revealed at the beginning of his medical career his originality of imagination coupled with an amazing capacity for applying such original ideas to practical use.

In his studies with Charcot at the Salpetriere and with Bernheim at the noted clinic for hypnosis at Nancy, he followed the approved course for the neurologist of his time wishing to prepare himself for the treatment of hysteria and allied conditions. Where hundreds of other promising young men following the same path acquired technical skill, the teachings of Charcot and Bernheim crystallized in Freud a process of thought which was to become the essence of that theory and practice later known as psychoanalysis.

At the very beginning he perceived the necessity for probing deeper into the unconscious for the cause of conscious symptoms and the nature of intrapsychic resistances. Influenced by the most advanced psychiatric practice of his time, Freud continued with the powerful medium of hypnosis in the initial phases of his work. After the discouraging and alarming turn of events which finally occurred in the first case treated by hypnosis and catharsis by the brilliant Joseph Breuer, it demanded major courage and much sacrifice of academic goals and economic advantage to persist in this hazardous method.

Deprived of the support of the established and locally respected Breuer, Freud continued independently to investigate hysterical manifestations and gradually modified the hypnotic and cathartic methods by the introduction of dream analysis as a means for approaching the unconscious. Without this painful isolation in work possibly Freud might have been tempted from the stony path along which he plodded for some 20 years with the disapproval of his medical associates ringing in his ears.

As is so often the case, the first important recognition of Freud came not from a university using his native German tongue, but from Clark University at Worcester, Massachusetts, in 1909 where he delivered his now famous five lectures. Some 20 years later he received the Goethe Prize of the City of Frankfort-on-the-Main awarded "to one whose creative influence is worthy of an honor dedicated to the memory of Goethe." In accepting, Freud wrote that he had not been spoilt by public honors and had, therefore, adapted himself to be able to dispense with them. Nevertheless, his pleasure in the recognition was genuine. Through one of those

startling twists of mass psychology which he had done so much to unravel, he has lived to see the very books which had earned for him the distinction of the Goethe Prize used as fuel for the holocaust at Berlin in 1934.

Freud's work may be divided broadly into three general periods: (1) the period of theory development (1885-1905), (2) the period of clinical application (1905-1920) and (3) the period of philosophical reflection (1920 to the present time).

A new epoch in the investigation of human motivation began when Freud abandoned hypnosis and gained access to the unconscious through free thought association and dream interpretation. For the first time a technique was advocated in which the physician devoted a maximum amount of time in attempts to understand the patient so that the latter might understand himself, and a minimum amount of attention in directing him.

To expatiate upon Freud's theories would be repeating what is well known and available in many languages, either in its full or abridged form. It may be mentioned that the dream, libido, childhood experience and sexual theories and their relationship to hysteria and anxiety were the result of meticulous, inexhaustible and tireless clinical observations. Concurrently with theory elaboration, Freud discovered a mass of mental mechanisms, such as projection, displacement, symbolism, which in the course of 30 years have proven invaluable not only in psychoanalysis but in general psychiatric practice.

By the age of 50, after 25 years of patient and daring investigation, Freud had formulated, tested and completed the basic theories of psychoanalysis. Just as Darwin's researches had demolished established conceptions regarding the independent development of the human species, so Freud's disconcerting revelations tended to undermine man's proud conceit of his mastery of his behavior. It is possible that at this time Freud himself did not foresee the extraordinary ramifications and amplifications for which his transcendent work opened the way.

During the next 15 years he added a profusion of brilliant contributions, some short, some long, which constantly extended the scope of the application of psychoanalysis. The more important of his clinical histories began with the ingenious analysis of the case of Dora (1903) and ended with the " History of an Infantile

Neurosis" (1918). They show Freud master of a literary style hitherto unknown in medical report writing—limpid and vivid, but so clear and sequential that the accuracy of the data never appears open to question. Of all the productions of this fruitful period none is more fascinating and amazing than the analysis of the autobiography of the psychotic Judge Schreber from which Freud developed his theory of paranoia.

Early during this period Freud's theories had begun to attract a group of progressive psychiatrists, not particularly in Austria but the Swiss Bleuler and Jung, the Hungarian Ferenczi, the British Jones, the German Abraham, the Dutch Von Emden and the American Brill. An international psychoanalytic movement was under way.

The essence of Freud's theory embraces a conflict between instinct and culture; its application is the quintessence of consideration for the individual. The two combined may produce a philosophy of life. In many of Freud's early works, especially those dealing with the analysis of art and literature, and in "Totem and Tabu," are frequent indications that psychoanalysis is more than a psychological theory or method of therapy—it may be an interpretation of the conditioning of civilization, its religions and its laws.

The comprehensive range of Freud's talents coupled with his mastery of literary presentation led to the proposal of his name for the Nobel Prize in Literature, endorsed by several great European writers, previous recipients of the honor. A proposal has been initiated in this country to call to the attention of American Nobel Prize winners the worthiness of Freud for that honor in medicine which has so profited by his genius.

The Great War with its bitter disillusions and futility weighed heavily upon Freud. From the writing of "Reflections on War and Peace" in 1915 to the present we find an increasing interest in the cultural and philosophical aspects of psychoanalysis and a decreasing tendency to deepen the clinical implications. Possibly Freud felt that he had exhausted the topic. At all events from 1920 to the present time there has appeared a series of speculative monographs dealing with religion, mass psychology, the pleasure principle, civilization and its discontents, in which subjective and personal views have replaced his earlier, strictly objective interpre-

tations. A lingering, threatening, distressing illness which Freud has intrepidly fought since 1923 seems to have impelled him to place with unwonted haste at the disposal of the world the profusion of ideas which flow from his inexhaustible fund.

Such is, in barest outline, the prodigious intellectual structure which Freud has offered to humanity. Of the social sciences, law, pedagogy, penology, sociology, anthropology and theology; of laboratory investigations, particularly neurophysiology and biochemistry, all have felt its trenchant impact. But psychoanalysis to the public and to the psychoanalyst has come to be regarded as a therapeutic measure. About the theory's present applicability and future prospects as an interpretative and curative measure our interest as psychiatrists centers.

Since 1920 Freud has made an important clinical modification of his theory—that of anxiety (1926). The new nomenclature of the categories of the psychical apparatus (super-ego, ego and id) introduced in 1923 was welcomed by most of the large body of practicing psychoanalysts as clarifying concepts but has had the drawback of conveying the impression that these systems are concrete and substantial.

With Freud since the age of 70 resting his clinical zeal, what additions have come to clinical psychoanalysis? In the past 10 years the great volume of valued contributions published in the half dozen periodicals devoted to the subject with significant regularity acknowledge that their basis is a hint from some one of Freud's writings.

Psychoanalytic teaching has been organized and standardized by the establishment of institutes under the direction of competent instructors in great cities here and abroad. Still the refinements and additions to technique and theory and the great increase in systematically trained analysts, many of them physicians of the highest calibre, have not produced either a shortening of the cumbersome process nor demonstrably better results in therapy. There even seems to be a tendency to protract both the time required for the training of the analyst and for the treatment of the patient. The extreme length is one of the obvious drawbacks of psychoanalytic treatment since it becomes available only to the well-to-do. If the method cannot be shortened, it is hoped that funds from Foundations may soon be applied to supplement the

cost for the less prosperous whose need for mental therapy is equally great.

At times one gets the impression that the student may become too deeply impregnated with organized psychoanalytic theory. This he may temporarily accept as literal truth and become so absorbed in the rigid application and demonstration of mechanisms that he overlooks the fact that they exist in an organism which may be emotionally unable to support too deep probing. Also, over-instruction in analytic theory in many cases seems to retard independent thinking on the part of the student.

Sometimes I have thought that the theory and practice of psychoanalysis resembles the automobile, with each of which I became acquainted about 1910. The theory of the internal combustion engine, corresponding to the theory of instinctual drive, has remained the same: the mode of transmission of power, corresponding to the general technique of free association, is not greatly changed. Good roads, like more tolerant public opinion to psychoanalysis, have facilitated and extended its range but each has been improved only with refinements, convenient but hardly fundamental. Notwithstanding, we are attracted to and examine the latest model. And we may find that it is so rakishly streamlined that we bump our heads against the low swung doors. But perhaps I am too sanguine in the hope of a psychotherapeutic aeroplane.

One of the subtlest tributes to the greatness of any work is its reexamination by those interested as the years pass. Freud in his search for truth has always been eager to reject what has been proven untenable in the complex system he evolved. What can we expect in the way of alteration of psychoanalytic theory and practice?

Examination of psychoanalytic literature and informal discussion with some of the analytic leaders reveal a great diversity of trends. These may be divided into two general categories—one which tends to extend and deepen metapsychological investigation and the other seeking to adapt current theories to factual testing. In the first group among the specific indications of study we find such topics as the accurate determination of the unconscious structure of the super-ego; the reapproach through hypnosis for research into personality problems, now using in conjunction with hypnosis the vast store of knowledge of personality structure gained through

psychoanalytic discoveries and the interesting theories of the British group concerned with the pregenital infantile frustrations and super-ego formation.

In the second group we find a general tendency among Freud's brilliant disciples to a reconsideration of the libido theory and a testing of its validity in the light of factual findings in psychiatric conditions; the reevaluation of physiological manifestations of mental attitudes, so frequently mentioned in the earliest psychoanalytic papers, in association with modern biological laboratory experimentation; a widening of the interpretations of symptom formation in neurotic conditions in terms of biological movement; a revision of concepts concerning female sexuality; and an inquiry into the extent which certain nuclear elements in neurosis-formation, generally considered instinctive, may be the product of cultural conditions. In addition, one finds a great variety of interesting but not essentially original proposals for application of established theory to sociological, anthropological and pedagogic problems.

On this occasion it is more appropriate to revert from speculation concerning the future of psychoanalysis to the proven contributions of Freud; to bring again to your attention that his theory appears to have solved some of the riddles of man's actions, old as man himself; that its application therapeutically has achieved results in mental conditions previously considered hopeless; that he has given to physicians a method which can be acquired and successfully administered by doctors of varied personal characteristics and intellectual capacity; and that the method is applicable, not only to the cure of mental disorder, but to the preventative approach of the study of an infinite variety of social ills.

It is a pleasure to think of the founder of psychoanalysis as a simple man of science who recast much of the known wisdom of the ages in a form available for scientific application, who deepened this wisdom with his own genial additions, who fought with intrepid devotion for his convictions. As a result of his labors thousands of sufferers from mental disease have directly benefitted, other millions have been indirectly affected by kindlier and more understanding attitudes on the part of society to their frailities and strivings.

Today, at 80 Freud's physical vigor is adequate, he spends four hours each day in the psychoanalysis of individuals; he has completed several monographs and is actively engaged in writing others. To reach the mellow age of 80 after so valiant a struggle and a wealth of accomplishment is ample reason for felicitation and congratulations to Professor Freud. We may consider ourselves fortunate to be gathered to pay homage to a patient scholar, an inspired critic, a creative psychologist, a penetrating clinician, a fearless thinker, Sigmund Freud.

NEURO-SEMANTIC AND NEURO-LINGUISTIC MECHANISMS OF EXTENSIONALIZATION.

General Semantics as a Natural Experimental Science.*

By COUNT ALFRED KORZYBSKI.

General Semantics is described as a General Theory of Values, and every psycho-logical reaction (semantic reaction) turns out to be an *evaluating* reaction of a non-elementalistic character which does not involve the splitting of semantic reaction into "intellect" and "emotions." Adjustment then becomes "proper evaluation," maladjustment a problem of "misevaluation." By using the term *evaluation* as a fundamental term, we bridge methodologically and linguistically the exact sciences with other sciences, psychiatry included. We gain thereby powerful neuro-linguistic and neuro-semantic *direct methods* for education and psychotherapy, the more so because evaluation represents a multiordinal mechanism, as exemplified later. Additionally we are enabled to deal with "causes" instead of "effects" or "symptoms." General Semantics is a strictly *experimental* natural science, with methods which in the two years since their publication have been successfully applied by psychiatrists, educators and the author.

Anthropology was originated by British scientists. They collected a great deal of valuable information about primitive peoples; although the recorded facts were correct, the *interpretations* were vitiated by reading into the primitive man some sort of imperfect white man reactions. A similar error is made when we read into a child "small man" reactions. The French and Polish school of anthropology corrected this error and studied primitive man on *his primitive level.* Analysis shows that the white man has *never been studied on the white level* and that we have read into the white man, animal, primitive or infantile reactions. Paradoxical as it may seem we have succeeded in making the study of primitive man scientific, and we have not as yet succeeded in applying scientific methods to ourselves.

* Read at the annual meeting of The American Association for the Advancement of Science, Section in Psychology, St. Louis, Mo., December 31, 1935.

General Semantics because of extensional (physico-mathematical) methods accomplishes this, requiring a complete revision of existing doctrines. The above formulates a genuine challenge which modern science has to meet, to prevent the nervous degeneration of the white race, of which Carrel warns.

To what extent this indictment is justified may be illustrated by endless quotations from practically all existing "scientific" literature, but here I will quote only an authoritative statement by two specialists. "The quality of responding to the signals, signs or symbols . . . . may be looked on as the unique expression of the highest type of integrative function. This quality, termed 'signalization' (Pavlov) *OR* 'symbolization' (A. Meyer), is the common denominator of all *conditioned* responses, which may differ enormously, etc." [1] (Italics are mine, A. K.)

The empirical effectiveness of General Semantics depends, among others, on the *amplification* of the Pavlov *animal* reflexology to the *human* level by introducing "degrees of conditionality," (see pp. 328, 332-343) [2] as yet noticed only by *one* psychiatric reviewer in the Archivio Generale di Neurologia Psichiatria e Psicoanalisi, No. 1 and 2, Vol. XVI, 1935. Obviously "condition*ed*" reactions gives an incorrect and misleading terminology because: (1) Every reaction is condition*ed* by something, and (2) "condition*ed*" reactions *cannot have degrees,* essential for the discrimination between animal and human reactions, and to a large extent between "sane" and pathological human reactions.

In General Semantics we deal with absolute individuals, $Smith_1$, $Smith_2$, etc., and we must sharply discriminate between animal "signal," reflex reactions, of *low* degree condition*ality*, and human "symbol" reactions which involve "meaning," *evaluation,* etc., of potential *full,* infinite-valued *conditionality.*

The "mentally" ill patient of Prince who had hay fever and *produced* an attack at the sight of *paper roses* (p. 128) [2] illustrates both these points: (1) The *low degree* of conditionality of his reactions, and (2) the animalistic, reflex or humanly ill "signal reactions," at the *sight* of paper roses.

[1] Archives of Neurology and Psychiatry, May 1935, p. 1033.

[2] Science and Sanity, An Introduction to Non-aristotelian Systems and General Semantics, by Alfred Korzybski, Science Press Printing Co., Lancaster, Pa.

Thus even in 1935 in serious papers, " symbols " were ascribed to dogs, and $Smith_n$'s reactions were read into dogs; and the dog's " signal " reactions were read into $Smith_n$. In fact if we accept the terms " condition*ed*," and " signal " *OR* " symbol," we make it impossible to treat $Smith_n$ on the white man's level. The term " condition*ed* " prevents the considerations of *degrees of conditionality* so characteristic of *human sane* reactions.

Such identification (" OR ") of " signal " with " symbol " reads human reactions into dogs, helping also to read animal reactions into human reactions, and successfully prevents the discrimination between " sanity " and " insanity," and the treatment of humans on the human level. The animal reflexologist, through similar " confusion of tongues," and making the degrees of conditionality impossible, reads the reactions of dogs into humans, making also the treatment of humans as humans, and a theory of sanity impossible.

Other examples are abundant everywhere, here we will illustrate only the discrepancies taken from the field of medicine.

The National Committee for Mental Hygiene published a report in 1933, Psychiatry in Medical Education, prepared by a number of leading psychiatrists, which is to be considered as an authoritative document. The report begins with the statement: " Dissatisfaction with the medical curriculum is met with on every side." It is common knowledge that most physicians are ignorant of psychiatry, and resort to every kind of useless or harmful therapy and even surgical operations, to the great detriment of the patients, while the sources of the troubles are psycho-logical. Today, medicine which neglects psychiatry represents nothing more than glorified veterinary science. How about psychiatry? The situation is also sad. Let the psychiatric report speak for itself: " It was held . . . . and properly, that the student was *unfitted* to tackle the problems presented by diseased tissue and ***perverted function*** until he had become thoroughly acquainted with healthy tissue and *normal function*" (p. 48). All human psycho-logical reactions ultimately represent problems of *evaluation,* and all psychopathological mechanisms, problems of *misevaluation.* How can psychiatry and psychotherapy become *scientific* and so more *efficient* if psychiatrists neglect General Semantics which discloses the mechanisms of " normal function " and the general factors of evalua-

tion which made science what it is. Further on p. 49 we read: "Medical men knew, and the laymen could not know, that *superficial snatches of medical learning* were already a powerful and prevalent factor in *promoting mental ill-health* throughout the community, etc." (in both quotations the italics are mine, A. K.)

The last quotation describes well-known and serious conditions, yet what psychiatry has entirely disregarded to date is the obvious fact that in dealing with the functioning and reactions of human organisms very often *mere ignorance is impossible*. We can have only *false knowledge*. This through the projecting mechanisms plays the well-known harmful rôle of "superficial snatches of medical learning." Thus for instance the term "sex glands" is a most confusing misnomer. The gonads ("sex glands") are internal secretion glands, and perhaps nine-tenths of their functioning is vitalizing the whole organism, *brain included*, and only one-tenth of their function may be called "sex proper." The above ratio is only approximate, more accuracy is not needed here for our purpose, as *any ratio* would illustrate the fact that we are *directly aware* of the one-tenth functioning and unless told by science, *entirely unaware* or *ignorant* of the nine-tenths functioning. The nervous mechanisms of projection, as, for instance, hysterical mechanisms which can produce wounds (stigmata), and which depend on psycho-logical disturbances are well known. In the case of the gonads (and other *functional* units) we see that mere ignorance is impossible, and without the full facts of modern science we have only *false knowledge* and *project* the one-tenth function on the nine-tenths function, and vice versa, *disorganizing both*. Thus it appears definitely that as the nervous system of the white man *produced science*, for the proper working of our white nervous systems, we must *know* the elementary data of physiology and neurology, otherwise *false knowledge* plays havoc with our nervous systems. The above radically changes our attitude toward science and its rôle in the white man's life; namely, that the minimum of scientific structural knowledge about the world we live in and ourselves, modern at each date, plays a neurological, sanity rôle. The empirical evidence is overwhelming, but to understand these mechanisms we cannot orient ourselves any longer by the traditional, two-valued, intensional, verbalistic, aristotelian orientations, based on dead anatomical "organs," "fibers," etc., apart from their

functioning (" schemes " in the language of Carrel). Instead we must have a new, modern, scientific, infinite-valued, *extensional,* non-aristotelian, 1936, *colloido-quantum* orientation which alone will allow us to deal with " realities," 1936.

Incidentally we discover that although the neuro-physiological projecting mechanisms are well known, yet this knowledge has not been utilized constructively even by the medical profession. The hysterical and other projection mechanisms establish an important and positive neuro-colloidal fact, that *such mechanisms do exist.* It is not realized that as low as in dogs projection mechanisms make " false pregnancy " quite common, showing how fundamental those mechanisms are. These mechanisms are utilized at present mostly for human detriment, but once we abandon animalistic signal reactions, with their colloidal concomitants, and pass to human symbol reactions, also with their colloidal concomitants, there is no reason why these mechanisms should not be made to work constructively. Some of the empirical results in extensionalization seem to point in this direction, in conformity with the latest experimental results. Doctor Gregory S. Razran duplicated the experiments of Pavlov on humans and discovered that human symbol reactions differ widely from animal signal reactions and are influenced more by attitudes, or, in general, semantic reactions, than by outward stimuli (see pp. 332-340).[3]

In his seminars the writer was astonished to observe what *automatic* and beneficial effect such elimination of structural false knowledge and the transformation of signal into symbol reactions, had on the students. The realization, for instance, of the one-tenth and nine-tenths ratio of the functioning of the gonads without any " preaching " eliminated in many instances some serious " sex " troubles. The *automatic* character of the beneficial working of General Semantics on other problems of human adjustment without any " preaching " is a significant practical point. Case histories are accumulating rapidly.

Once General Semantics is applied, and we concentrate on *evaluating* reactions, many issues become workable. Thus if we try to speak to modern youth in terms of " morals," " ethics," " honesty,"

[3] Science and Sanity, An Introduction to Non-aristotelian Systems and General Semantics, by Alfred Korzybski, Science Press Printing Co., Lancaster, Pa.

and what not, and we are told " I do not believe in the old bunk," we are dismissed for good. There is no comeback, no matter how beneficial our advice could possibly be. But if we speak in *terms of evaluation,* and we are carelessly dismissed in a similar way, this will not work because *lack of evaluation is evaluation of low order.* We are dealing with a *multiordinal mechanism* (see index of Science and Sanity) which can *not* be dismissed, and remains active.

The main principle of General Semantics is that for optimum adjustment, " mental " health, we need *predictability.* The main usefulness of science depends on this predictability which eliminates shocks. Predictability of a form of representation, be it a map or a *language,* depends on the *similarity of structure* of the form of representation with the events represented. For instance, in actuality Chicago is *between* San Francisco and New York. If we had a map *not* similar in structure to the territory; namely, representing San Francisco *between* Chicago and New York our traveling would become *unpredictable* and we would have many shocks forthcoming, which would be avoidable, if the map were *similar in structure.* This applies to *any form of representation, LANGUAGE included.* Our personal, social, economic or political adjustment and, in fact, the problem of *sanity* of the white race depends on whether the *language* we use is similar, or *not* similar, in structure to the world and our organisms.

This is not a problem for speculation but a *new* problem of *fact,* to be ascertained by *enquiry* into *facts*—1936. The problems are simple and definite. In nature " matter," " space," " time," *cannot* be divided, or split, though *verbally* we can split them. Actually " body " and " mind "; " intellect " and " emotions," etc., cannot be divided; verbally we can split them. Obviously these forms of representation or languages we use are *not* similar in structure to the facts and, in principle, predictability becomes impossible.

Once facts become obvious, the white man as a rule solves his problems. Thus in physics Einstein and his co-workers have produced a non-elementalistic language of space-time, similar in structure to the facts of the world. Most important empirical consequences have already been reached from this linguistic adjustment. Similarly in human affairs, General Semantics introduces *non-elementalistic* terminology and empirical results follow automatically, as mentioned before.

Definitions by "intension" (spelled with an "s"), define by aristotelian "properties," thus a "man" may be defined, say, as a "featherless biped." In a world of absolute individuals, Smith_1, Smith_2, etc., such an intensional definition applies to *everybody* and covers *nobody*. Intensional existing orientations and *language* appear *not* "similar in structure" to the *facts* of life, and predictability is made impossible. Known, yet avoidable, human tragedies follow.

Mathematical and semantic extensional definitions would *exhibit* the individuals and define "man" as "a class of individuals, Smith_1, Smith_2, etc., SIMILAR IN STRUCTURE to the *facts of life*. In the past we have had need for extension and so had such extensional *expressions* as "this chair," yet the actual *words* were intensional. If we say "chair_1," something crucial yet unexpected happens; namely, we have radically changed the *structure* of language (intensional to extensional) without changing the language. We have made the language similar in structure to the facts of life, and optimum predictability and better adjustment become empirical facts.

Extensionalization is not a new cultural fact in our history. Some time ago we needed for further progress in mathematics an infinite number of symbols, which no number of alphabets could supply. The extensionalization of one letter, say "x" produced the desirable change: namely, x_1, x_2, x_3, etc., supplied the needed infinite number of symbols. At present in the tensor calculus, on which modern physics depends, we have reached the maximum of extensionalization of 1936; we have symbols like δ^{mn}_{pq} and these five letters allow us to handle many complex equations as an unit, facilitating enormously the work.

In life we have come to a similar impasse. Our lives are lived under *actual* conditions made by *extensional* science, while our orientations remain hopelessly *intensional*. Adjustment—and so sanity—is less and less possible, and with the further advance of science increasingly impossible. We have thus either to abandon *extensional* scientific advance, to save our sanity, or extensionalize our orientations and the structure of our language.

General Semantics suggests that we extensionalize our orientations. This means a revision of our old semi-primitive orientations and making them scientific 1936. This is accomplished by similar

simple devices as was accomplished in mathematics. The extensional devices are as follows: (1) Indexes. (2) Dates. (3) Quotes. (4) Hyphens. (5) Etc. They should be continuously in our heads and orientations, although seldom used explicitly outside of explicit difficulties.

Those interested in this subject will find further details in the book *Science and Sanity*. Although extensionalization seems innocent, it is not, as it involves an *automatic stimulation* of the cerebral cortex, with all the neurological benefits for the "organism-as-a-whole." The mechanism is simple and workable in practice.

The human cerebral cortex has many functions, among others (1) dynamogenic effects, (2) differential activation, which taken *separately* (elementalistically) represent only *verbal* fictions, non-existing in nature ("schemes" of Carrel), because the nervous system works as-a-whole (non-elementalistically). There is, however, one function of the cerebral cortex which is not a verbal fiction; namely, that the cerebral cortex introduces a *functional delay in reactions*. If we can introduce *automatic* and *habitual* delay in reactions, we *automatically stimulate* the cortex, with all beneficial consequences following. It is evident that extensionalization does this. If we cease dealing with intensional verbal fictions such as "man," "chair," etc., and deal with extensional labels for realities, such as $Smith_1$, $Smith_2$, etc., or $chair_1$, $chair_2$, etc. (dates included), we *automatically order* the reactions by introducing four-dimensional *seriation*, which in turn *automatically* results in a *permanent delay in reactions* for a small fraction of a second, and so engages the participation of the cortex in the reactions.

Only the understanding of these neuro-semantic, neuro-linguistic and neuro-muscular mechanisms makes certain of the results obtained by Doctor Rosett in his experiments with epileptics comprehensible and significant from a new angle.[3] Rosett made a study of epileptics. He trained them over a long period of time to breathe or to perform simple movements in synchrony with the beats of a metronome. Epilepsy improved in various degrees, however not in all cases, but in every case treated by this method, character, temper, "mentality," reading interests, were markedly improved. It should be emphasized that no other educational means were employed and so the above "character" results were achieved

automatically (see case reports, p. 789).[4] The explanation seems simple. An organism is not a machine in the sense of a metronome. To synchronize our reactions with a metronome we must *adjust* them, keep them under control, and so automatically *delay the reactions,* or accelerate them. In the case of the cortex the delay is of importance, and so the introduction of this *delay* by Rosett's method of training under peculiarly difficult conditions brought about the stimulation of the cortex with the above mentioned consequences. The findings of Rosett are fundamental for General Semantics in connection with *ordering the reactions* by the training with the Structural Differential, supplying this coveted *delay in reaction* and a complete co-ordination of *neuro*-semantic, *neuro*-linguistic and *neuro*-muscular organism-as-a-whole issues involved.

General Semantics, through the method of *extensionalization,* automatically introduces this desirable constant delay in reactions for a small fraction of a second, not detrimental in life, yet of very serious *neurological* value, transforming the animalistic (humanly pathological) *signal* reactions of *low* conditionality into human *symbol* reactions of *full conditionality,* by the stimulation of the cerebral cortex. The above explains the empirical and automatic beneficial results.

Science and Sanity, An Introduction to Non-aristotelian Systems and General Semantics was published in the autumn of 1933, introducing General Semantics to the public (General Theory of Values). Since then co-workers have *applied* extensionalization to " mentally " ill, in hospitals and private psychiatric practice; reformatories; education, both of abnormal and " normal " persons in some schools, colleges and universities; and finally in private adjustment of the individual lives of different lay students. General Semantics has also been utilized by specialists in various branches of science to revise the older formulations and difficulties. Some of the experimental results have been reported before the First American Congress for General Semantics, held, March 1 and 2, 1935, at Washington State Normal School, Ellensburg, Washington, in various scientific papers and also in correspondence with the writer. The results seem uniform and standard; namely, that

[4] " The Epileptic Seizure, Its Relation to Normal Thought and Normal Action," by Joshua Rosett, M. D. Archives of Neurology and Psychiatry, April 1929.

"extensionalization" is in principle, workable when applied in practice. Some of the results are: (1) After a few months training some "mental" cases recovered, without relapses thus far; (2) subnormal students became practically "average"; (3) some of the poorest students became the best; (4) students overcame unclassified blockages and handicaps, became better adjusted to life and found their studies easier; (5) practically in 99 per cent of cases, in *serious students* of General Semantics, some individual beneficial results in adjustment followed; (6) a number of psychiatrists report that they find semantic methods efficient in shortening the period of psychotherapy, allowing also for group treatment; (7) the writer in his seminars has verified these seemingly automatic general results.

In conclusion it may be stated that the white race has come to an impasse, the *actual* conditions of life are shaped by *extensional* science; while our inner orientations and the structure of language remain intensional. Increasing maladjustments must follow, as we actually observe. Future issues are clear from the point of view of *predictability,* either we return to primitive states and abolish extensional science, and then perhaps survive; or we transform our orientations to conform with the actualities of our lives, in other words extensionalize them. It seems that this choice must be made as a general cultural issue and we must stop reading animal and primitive reactions into the white man and by extensional scientific analysis find out what standards of evaluation belong to the white man's level and correspond to the functioning of his nervous system. In General Semantics such an attempt has been made, and so far results seem to justify it.

ALZHEIMER'S DISEASE—THE SO-CALLED JUVENILE TYPE.*

(With Report of a Case.)

By GEORGE A. JERVIS, M. D., and SAMUEL E. SOLTZ, M. D.

The first description of this form of organic psychosis was made by Alzheimer [1] in 1906. It was at this period that he fully studied a case of progressive presenile dementia with focal cortical symptoms and particular pathological features. Later on, Kraepelin [2] on the basis of several cases, carefully surveyed the clinical manifestations of this condition and outlined the outstanding criteria for its differentiation from other organic psychoses occurring in the senium and presenium. He proposed for it the name of Alzheimer's disease.

The clinical picture and pathological features of the disease seem nowadays well established. However, its etiology and pathogenesis are still open problems, although it is widely accepted that the disease constitutes an early atypical form of senile dementia.

The etiological factor becomes more complex when the inclusion of the so-called juvenile form of Alzheimer's disease is made. Considering that the presenium runs from 45 to 60 years of age, the incidence of Alzheimer's disease in a period of life preceding 45 years might constitute the variety termed by some authors as the " juvenile form." The question arises now as to whether such early cases with more or less typical pathological findings should really be considered as the " juvenile " aspect of Alzheimer's disease even though the clinical data do not always correspond to the classical form.

With the view in mind of contributing to the solution of this question, we are illustrating the clinical and pathological aspects

* The authors are grateful to the Manhattan State Hospital for the clinical notes on the case and in particular to Dr. Atkin, who during the life of the patient made a careful clinical study and the diagnosis of Alzheimer's disease.

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of a case diagnosed in life as Alzheimer's disease and in which the first symptoms made their appearance at the age of 38 years. The literature of the so-called juvenile form of Alzheimer's disease is also reviewed with the object of establishing the relationship of the so-called juvenile form to the classical one.

CASE REPORT (N. 80062).—The patient, a white male of German extraction, butcher by occupation, married, was admitted to the Manhattan State Hospital July 13, 1928, with the chief complaints of memory impairment, irritability and confusion. The family history was essentially negative except that his mother died at the age of 30 from a nervous ailment of unknown nature. The patient schooled in Germany and only reached the third class in high school. His prepsychotic personality never showed abnormal trends. He was sociable and greatly interested in music, fond of his parents, especially his mother. He had been married for 20 years and had four children. His sexual life was normal so far as one could ascertain, though during a two-year-period prior to his illness, he abstained from sex relations. He had pneumonia on three occasions without any complications. He never indulged to any great excess in intoxicating beverages, and there was no history of venereal diseases.

The wife stated that there had been a gradual though definite change in her husband's character over a period of three years. In 1925, when he was 38 years of age, she first noticed that he became easily distractible and irritable about trivial matters. Whereas formerly he used to take things lightly and was quite cheerful and even-tempered, later he became impulsive and insisted upon being the head of the house. Generally, he wanted to be alone and seemed to be preoccupied. She likewise noticed that he was forgetful and seemed to lose contact with everyday affairs. He continued to work, however, until February, 1926, when he was brought home in a semi-conscious condition. The family physician attributed the sudden illness to a possible apoplexy associated with a mild weakness of the left side of the body. However, he completely recovered within a short time without any apparent motor disability. Following this attack he became more confused and depressed; disclosed a poor memory and had to be cared for at home. Finally, he grew more restless and unmanageable and was committed to the hospital.

Physical Examination.—The patient was a fairly well-nourished white male adult, height 5 feet 8 inches, weight 135 pounds, who presented no abnormal bodily features. Gait and coordination were normal. Speech was slow and indistinct at times. There were no definite signs of aphasia. The patient showed some impairment in writing and in the performance of skilled acts. The tendon reflexes were present and active throughout with some hyperactivity of the knee jerks. There were no pathological reflexes. Sensation was intact. Pupils were equal, central in position; reacted to light directly and consensually, in accommodation and on convergence. Fundi examination was essentially negative. Visual fields were normal. Other cranial nerves showed no abnormalities. Cardio-vascular system was negative and there

was no evidence of arteriosclerosis. B. P. was 122/74. Laboratory examinations revealed a negative Wassermann in blood and spinal fluid. The latter showed no increase in protein, globulin or cells. X-ray of the skull was normal.

Mental Examination.—Patient wandered aimlessly about the wards and was too confused to participate in any form of work. He was somewhat untidy. At times he was quiet, indifferent and seclusive. At the beginning of conversation, patient would act as though he understood questions, but most of the time had to be urged to answer and occasionally his replies were meaningless. His perplexed state and bewilderment continued for several weeks while under study. He misidentified individuals, particularly relatives and those in close contact with him. He was unable to formulate clearly material concerning his past life. Emotionally, he would alternate between depressive moods and euphoria.

He was fairly well oriented for time and person but not for place. His memory showed most defect in recent rather than remote events. His retention and immediate recall were poor. It was likewise evident that he could not calculate. General everyday knowledge was deficient. Insight and judgment were extremely poor. The ability to concentrate and to focus attention was greatly altered.

Course.—The patient showed no evident signs of progression. Somehow he adapted himself to simple forms of work. His general appearance and personal habits continued the same. He was greatly retarded in speech but showed no aphasic manifestations. After a period of four months his relatives decided to take him home for further care, and he was discharged November 18, 1928, as unimproved.

On May 11, 1929, the patient was brought back to the hospital. His relatives then stated that they were unable to manage him. They noticed in particular, defective speech and uncertainty of gait. Physical examination at this time revealed slowness and awkwardness in walking; some incoordination of both lower extremities; increased tonicity of the muscles; hyperreflexia with bilateral patellar and ankle clonus; diminished abdominal and cremasteric reflexes; no pathological reflexes. The fundi examination revealed some haziness in outline of the left disc without any tortuosity of veins or sclerosis of the arteries. There were no contractures or abnormal involuntary movements. His speech was somewhat thick and slurred. At that time he was definitely aphasic; although the exact type was not clearly determined due to the marked mental deterioration, yet it became apparent, through various tests, that the sensory type prevailed. In attempts at writing the patient made unnecessary, uncertain and ineffectual movements, and succeeded in scribbling something which was illegible and of no meaning. Evident alexia was present. In testing for apraxia, there was marked bilateral alteration with more involvement in the right than the left hand; the apraxic defect was perhaps accentuated by his confused state. Repeated laboratory tests were negative.

Further determination of the mental status revealed a rapid and progressive deterioration. He was dull, indifferent and careless about his personal habits. He was limited in his understanding. Questions were answered mostly in a mumbling and unintelligible manner. He gave an impression of emotional disintegration, apathy alternating with periods of slight euphoria. On one occasion he made a rather vague and unreliable admission of auditory hallucination in which he claimed to have heard the "voice of God"; when asked "What did He tell you?" he answered "water," in a befuddled manner. He was completely disoriented in all spheres; retention and immediate recall were definitely reduced.

Three months later, motivation was hindered, and he had to be led everywhere. He was passive and would remain in any position he was placed in. His speech was generally composed of silent movements of the lips, grunts and unintelligible noises. He gradually became bed-ridden and had to be fed. He was incontinent of urine and feces. Occasional twitchings of the body were noticed with extreme rigidity. He continued in this vegetative condition and died November 6, 1929, of bronchopneumonia.

Post-mortem was performed 18 hours after death. The body was that of an ill-nourished though well developed white male adult, weight 86 pounds and height 5 feet 8 inches. The examination of viscera disclosed the following essential findings: early bilateral bronchopneumonia, atherosclerosis of the aorta with slight thickening of the aortic cusps, and biliary calculi. The pituitary, thyroid, parathyroid, adrenal and pancreatic glands were normal, on both macroscopical and histological examination.

The brain was grossly smaller than normal and without recognizable changes in consistency. The convolutions were definitely atrophic and the process was rather diffuse being slightly more accentuated in the frontal lobes than elsewhere. The sulci were concomitantly widened in these areas. The vessels at the base of the brain showed evidence of slight thickening. The ventricular system was mildly and equally dilated on both sides. The choroid plexus presented grossly a granular appearance. The dura stripped with fair ease, and the pia was thickened and adherent to the underlying tissue. On sagittal sectioning, the gray matter was seen to be somewhat diffusely atrophic. The cerebellum, midbrain, medulla and spinal cord showed no abnormalities.

Histological Examination of the Brain (No. 1505).—With the Nissl stain and H. & E. preparations, the leptomeninges showed areas of thickening particularly accentuated in the frontal lobe; the thickening was due to an increase of fibrous connective elements rather than to cellular multiplication. Some blood vessels of the meninges revealed definite but slight arteriosclerotic alterations: intima proliferations, degenerative changes of the proliferated tissue, thickening and sclerosis of the media. No perivascular infiltrations were seen.

Sections of different cortical areas, stained with Nissl's method, showed marked nerve cell changes which were manifested chiefly in the frontal lobe and to a less degree in the parietal and temporal lobes. A diffuse diminution

in the number of cortical nerve cells was a striking finding; as a result the thickness of the gray matter was diminished and the cytoarchitecture considerably disturbed (Fig. 1). In the external layers, first, second and third, the atrophic changes generally were more pronounced; a selectivity for the third layer was observed in a few instances. In the atrophic zones the glia nuclei often proliferated. The boundary between gray and white matter was often poorly defined. In addition to the diffuse atrophic changes small areas were observed in which the cells had completely disappeared; these partly were independent of and partly corresponded to, senile plaques as revealed in silver impregnations. Severe cytologic alterations were found in many ganglion cells. They consisted of various degenerative changes among which shrinkage and sclerosis were noticeable. The granulo-vacuolar degeneration of Simchowicz was observed occasionally in the Ammon's horn. The lipoid content of the nerve cells was decidedly increased (Sharlack R, Sudan III and Fettponceau methods for fat tissue).

In Spielmeyer's preparations for myelin sheaths, the radial and longitudinal fibers in the cortical gray matter appeared diminished in number. Moreover, small round or oval areas of demyelinization were observed. In the subcortical layers the myelin was diffusely palely stained and the sheaths appeared thinner than normal. Definite reduction in their number was noticeable.

Holzer stain for glia fibers showed a definite increase in the cortical glia network; the subpial fibrils appeared particularly numerous and thicker than normal. Gliosis was also found corresponding to patchy areas in the white substance. Cellular glia changes were studied with the Cajal and Hortega methods; a marked proliferation of astrocytes was observed in all sections of the cortex, in proportion to the destruction of the ganglion cells. Hypertrophic astrocytes with longer and thicker dendrites were frequently noticed. Degenerative changes were observed also though not very frequently. Hyperplasia and hypertrophy, at times associated with regressive changes, were disclosed in both microglia and oligodendroglia. Details of their relationship with senile plaques will be described later on.

In addition to this rather common histological picture of a diffuse evenly distributed process of atrophy of the cortex resulting from nerve cell degeneration, glia reaction and myelin sheath involvement, the pathological picture presented the two characteristic features of senile plaques and Alzheimer's neurofibrillary changes of nerve cells.

The senile plaques were studied with Bielschowsky's method for neurofibrils, Cajal's gold sublimate for astrocytes and Hortega's silver impregnation for oligo- and microglia cells. The senile plaques were found mainly in the grey matter (Fig. 2). To a slight degree they were present in the white matter and more so in the subcortical layer. In the cortex they were found nearly everywhere, though more abundant in the second and third layers. The plaques were predominant in the frontal and parietal lobes and in Ammon's horn. To a lesser extent they were present in the occipital cortex. In the cerebellum they were present within a fair range, in the mo-

lecular, Purkinje's and occasionally in the granular layer. In the Purkinje's layer, occasional plaques were seen to occupy the exact locus of a Purkinje's cell. In the corpus striatum they were numerous; in the medulla, pons, midbrain, hypothalamus and thalamus practically absent.

The morphological characteristics of the plaques varied considerably. The more numerous forms were the minute plaques which were made up of interwoven argentophile fibers, cellular elements and degenerative products. It was sometimes difficult to determine the kind of glia or nerve cells within such plaques. Next in frequency were the plaques with a nuclear-like body of cellular structure surrounded by radiating and star-shaped processes, or by granular detritus. Finally, rare were the ones with a nuclear-like body of amorphous structure surrounded by a pale ring of fragmented fibrils and by a dark granular crown at the periphery.

The relationship of the plaques to the blood vessels was difficult to establish. However, it was evident that numerous plaques were in immediate proximity to the small vessels, and in some areas the blood vessels penetrated or encircled the plaques.

The astrocytes surrounding the plaques reacted with both hyperplastic and hypertrophic changes constituting a crown-like area around the plaques (Fig. 3). Degenerative chang fragmentation of the processes along with various stages of disintegration the cell body, were also noted. The processes of the astrocytes rarely penetrated the fibrillary detritus of the plaques.

Though microglia were often seen surrounding the plaques with their dendrites, they were also found within the plaques constituting at times the nuclear-like portion of the plaques with the dendrites as radiations (Fig. 4). Quite often microglia cells were seen undergoing degenerative changes: swelling and vacuolization of their plasma, alterations of the nucleus, uneven argentophilia, knob-like terminations and fragmentation of their processes. In certain areas these degenerative changes were so advanced as to make hardly recognizable the morphology of the cells. The participation of the oligodendroglia was less pronounced though along the same lines.

The Alzheimer neurofibrillary degeneration of the nerve cells was most prominent in the frontal and parietal lobes, Ammon's horn and to a lesser extent in the other cortical regions. It was practically absent in the basal ganglia, pons, midbrain, cerebellum and medulla. When present, the involvement was extensive throughout the various layers of the cortex without specific relationship to certain types of cells. In certain regions the proportion of diseased cells to normal cells was 1 to 5 or 6. There was no appreciable correlation between the most involved areas and the distribution of blood vessels. With the Nissl's stain, the involved nerve cell revealed central absence of tigroid substance and eccentricity of the nucleus. With the DaFano's modification of Bielschowsky stain, several stages of the neurofibrillary disease could be detected. At times the neurofibrils were only reduced in number, strongly argentophilic, with a cell body and a nucleus of normal appearance; at others the cell body appeared distorted, with an eccentric nucleus and scanty but thick and dense neurofibrillar network dis-

placed on one side of the cell; at others finally, the cell appeared as a homogeneous oval body with the heavily stained fibrils assuming various peculiar aspects: oval, comma, spiral and basket-like appearances (Fig. 5).

With the Bennhold and Letterer's congo red method, deposits of amyloid substances were seen in the body of some ganglion cells in regions where neurofibrillar degeneration was prominent. Amyloid products were also evident in the central portion of some plaques and occasionally within the wall of some blood vessels.

DISCUSSION.

As a fundamental preliminary in a discussion intended to clarify the question of the so-called juvenile type of Alzheimer's disease, it is necessary once again to recall briefly the essential features of the clinicopathological entity which constitutes Alzheimer's disease according to the school of Munich.

The symptomatology is manifested by three components, each one subject to variations in its intensity, duration and sequence. (A) The first component consists of the mental reaction, organic in type, which runs a progressive and fairly rapid course, leading to an early and severe dementia. It is characterized by a severe memory impairment for recent and remote events and by marked weakness of the process of attention to which affective disorders, generally in the form of indifference, are associated. Orientation, comprehension and retention become early involved, and the mental impairment gradually and progressively advances to a stage of intellectual deterioration. (B) The second component is represented by focal cortical signs; in order of frequency they are aphasia, often sensorial and transcortical in type, with frequent paraphasia, apraxia, agraphia, alexia, agnosia, asymbolia and finally psychic blindness. Additional speech disorders of diagnostic importance are: iteration and perseveration of words, rambling speech, verbal stereotypies, logoclonia, verbigeration, scanning and grouping of words. (C) The third component is represented by neurological signs, widely varied in amount and degree. They consist among others of hyperactivity of the reflexes, pyramidal tract signs, alteration in the pupillary activity, incoordination, tremors, postural disturbances, rigidities, contractures, and not infrequently convulsive disorders usually in the form of generalized epileptic seizures.

The characteristic brain pathology of Alzheimer's disease needs no re-emphasis. Besides the common senile alterations, consisting of atrophy, degenerative changes, sclerosis, pigmentation, fatty degeneration of the nerve cells and consequent glia reaction, the pathology is characterized by the so-called Alzheimer's fibrillary disease of the nerve cell and by the presence of senile plaques. The granulo-vacuolar degeneration of Simchowicz has been described by Gruenthal as an additional complement to the histological findings.

Subsequent pathological investigations made by numerous authors have tended to disintegrate the pathological unity of Alzheimer's disease, consequently raising the question as to the basis upon which the pathological diagnosis should be made.

Many investigators have found neurofibrillary changes and senile plaques in the brain of senile individuals who presented no psychotic symptomatology during life. Constantini,[3] Ley,[4] and others have described a few cases in which such formations occurred. Gellerstaedt [5] likewise detected in normal senile brains the presence of senile plaques in 84 per cent, of neurofibril alteration in 87 per cent, and of granulo-vacuolar degeneration in 40 per cent of the cases examined; in each positive case, however, such changes were few in number and at times detectable only following careful examination.

On the other hand, in many pathological conditions independent of senility, senile plaques were found. Thus in juvenile cases of tabes (Alzheimer),[6] epilepsy (Klarfeld),[7] alcoholism (Simchowicz),[8] schizophrenia (Grünthal),[9] amyotrophic lateral sclerosis (Bogaert and Bertrand) [10] and tuberculosis (Struwe).[11] Neurofibrillary degeneration has been described in various human diseases including familial spastic paralysis (Schaffer),[12] post-encephalitic Parkinsonism (Lewy,[13] Fentes,[14] Hallervorden [15]), Tay-Sachs disease (Marinesco [16]), hereditary cerebellar ataxia (Schaffer [17]), amyotrophic lateral sclerosis (Bogaert and Bertrand [10]), disseminated sclerosis (Luthy [18]), Pick's disease (Gans,[19] Moyano [20]). In experimental pathology, reports of such cellular changes are found in the literature, though Spielmeyer [21] is quite doubtful as to their resemblance to the same changes in human brains. Achucarro [22] for instance reported the neurofibrillary disease in experi-

mental rabies; Balli,[23] Lewy,[24] and Rasdoslky [25] in parathyroidectomized and thyroidectomized animals and Donaggio [26] in hibernating and starved animals. In most of the above-mentioned conditions, neurofibrillary degeneration and senile plaques were generally scarce, contrasting with Alzheimer's disease in which they always occur in large numbers. The quantitative criterion may be helpful, therefore, in the differential aspect of the pathological findings in Alzheimer's disease.

More pronounced difficulties arise when one tries to differentiate Alzheimer's disease from the common type of senile dementia by particular study of senile plaques. Attempts have been made to formulate a criterion based on the regional difference in the number of senile plaques in the two conditions. Thus, Simchowicz [27] basing his conclusions upon the number of senile plaques located in the frontal lobes (nominator) with the number found in the occipital areas (denominator) established an index which is greater than one in senile dementia and less than one in Alzheimer's disease. Rostan [28] applied this criterion to one of his cases and agreed with Simchowicz, whereas other authors have found indices which were greater than the unit in Alzheimer's disease.

Can a differentiation based on the morphology of the senile plaques be of any value? Conceptions of the histogenesis of the senile plaques are still at wide variance. An hypothesis of some toxic reaction resulting in necrobiosis or in a disturbed physicochemical balance of the tissues has been advanced by some authors. The exact pathogenetic mechanism is very hard to determine. According to the recent works of Bolsi,[29] Marchand [30] and Braunmühl [31] the intercellular tissue reacts first in the formation of the plaques. Ferraro [32] has shown by histological criteria that the cellular elements (microglia, oligodendroglia and nerve cells) may constitute the elements first involved in the formation of the plaques. Wherever the process begins, there is reason to believe that the glia tissue promptly reacts to the focal disturbance; the morphologic aspect of this glia reaction might therefore determine the degree of the toxicity. With this view in mind, we felt that two types of response to plaque formation might be inferred: one in which the plaque determines a mild glia reaction without severe degenerative alterations, and the other in which numerous glia cells surround and encroach upon the plaques; the glia cells present

here definite degenerative changes. This second type of reaction has been principally encountered in our case. Further investigation on the intensity and significance of the glia reaction is, however, necessary.

Altogether we feel, as does Grünthal [33] that from the pathological viewpoint alone, Alzheimer's disease cannot be differentiated from cases of senile dementia.

All these pathological findings both in senile and non-senile conditions lead one to admit that not the pathology, which is not pathognomonic, but the clinical symptomatology, which constitutes, as pointed out by Kraepelin,[2] a solid unit, must play an important rôle in determining the final diagnosis of Alzheimer's disease.

With such facts in view, the problem of the so-called juvenile type of Alzheimer's disease should include the very important question as to whether in the use of this term by various authors the original understanding of the malady has not been unduly stretched to include conditions which do not correspond to the Alzheimer's clinico-pathological entity as outlined by Kraepelin.

A survey of the literature has disclosed to us 10 cases of presumable Alzheimer's disease, occurring at an age prior to the presenium and referred to therefore as " juvenile forms."

In 1909 Perusini [34] illustrated the case of a male aged 39, whose history revealed personality changes, marked memory impairment, emotional instability, convulsions and visual hallucinations. In addition, there were agraphia, alexia, dysarthria, sensory aphasia, incoordination and tremors. The pathological findings were typical of the disease, a large number of senile plaques and neurofibrillary changes being found in the cortex, with regional accentuations. The duration of the disease was six years and the course rapid at first then progressively slower.

In 1911 Schnitzler [35] reported a case of a female aged 32, in whom symptoms of myxedema were associated with intellectual impairment. The course of the disease which lasted $3\frac{1}{2}$ years was characterized by a slowly progressive apathetic dementia. Definite cortical focal signs such as aphasia and apraxia were absent. Transient neurological features such as facial weakness, ptosis, bulbar signs and paresis of left fingers appeared during the last period of the disease. The pathology showed neurofibrillary changes

of Alzheimer's type in the frontal lobe and in Ammon's horn, but no plaques, no increased lipoid content of the nerve cells nor glia reaction were present.

One year later, Lafora [36] recorded a case of a female aged 36 who clinically presented a severe mental reaction characterized by negativism, hallucinations and ideas of persecution. The neurological examination was completely negative. The post-mortem examination of the brain revealed pathological features of Alzheimer's disease: neurofibrillary changes and senile plaques, present, however, in small numbers.

In 1913, Barrett [37] described the case of a female aged 35 who clinically exhibited gradual mental deterioration with restlessness, disorientation, euphoria alternating with depressive moods. Generalized convulsions occurred frequently. In addition, striking neurological symptoms were evident from the very beginning of the mental deterioration. They consisted of rigidity and paresis of the legs with bilateral increase of the deep reflexes and unilateral Babinski, tremors, twitching movements and jerking of the legs and arms. The right arm was also in a spastic condition and marked ataxia was present in hand movements. The patient died at 42 years of age in a state of complete dementia and general contracture. The histologic study revealed numerous plaques and the peculiar neurofibril alterations in all regions of the cortex. Plaques were found also in both optic thalami, corpora striata and in the cerebellum, although few in number. In addition a striking degeneration of the pyramidal tract, traceable from the peduncles into the lower sacral region of the cord was an unusual pathological finding.

In 1921, Weiman [38] at a meeting of the Psychiatric Society of Munich presented a case of a male aged 37, in whom the mental features were those of behavior disturbances, compulsions and restlessness. Focal neurological signs were scanty. The pathology of the brain revealed a diffuse neurofibrillary degeneration without senile plaques; marked deposition of calcium in the nervous tissue was an outstanding finding along with advanced sclerosis of the vessels of the brain.

A female aged 37 was reported by Urechia and Danetz [39] in 1924. She disclosed definite memory loss, disinterest, convulsions, apraxia and paraphasia. Neurological examination was otherwise negative

except for rigidity and spastic contractures. Histological examination revealed the usual pathological findings of Alzheimer's disease.

In 1929, Malamud and Lowenberg [40] reported the case of a boy who at the age of seven developed mental deficiency following an attack of scarlet fever. At 15 years of age he showed a symptomatology of excitement, restlessness, confusion, impulsive attitude and asocial tendencies. At times negativism and mutism were observed. No neurological symptoms and particularly no focal cortical signs were present. There was a remission of about four years in the course of the disease which lasted nine years. The post-mortem examination showed a more or less diffuse neurofibrillary degeneration with numerous plaques involving the entire cerebral cortex, basal ganglia and cerebellum. In addition, an extensive degenerative process of the blood vessels of the choroid plexus was reported.

In 1931, Lowenberg and Rothchild [41] described the case of a woman who at the age of 37, during the last few weeks of pregnancy, showed restlessness, confusion and memory defects. This condition lasted several months, improved gradually and for a period of eight years an almost complete recovery was observed. About a year previous to admission, pronounced mental symptoms recurred. Confusion, irritability, hallucinations and delusions were prominent features. Later on her speech became incoherent and acute excitement with aimless overactivity was observed. The patient died at the age of 47 with signs of bilateral suppurative mastoiditis. Microscopic examination of the brain revealed a large number of senile plaques in all layers of the cerebral cortex. A careful search failed to reveal changes of the neurofibrils.

In 1932, Schottky [42] illustrated the case of a female age 41 who for three or four years had been suffering from lack of initiative, memory impairment and emotional lability in association with a menopausal condition. Sometime later her speech became slow and she gradually developed a bilateral apraxia and agraphia. As the intellectual impairment became more serious, definite logoclonia and paraphasia became evident. There was a marked disturbance in gait, with spastic contractures and facial weakness. Histological study revealed the characteristic diffuse Alzheimer's features in the brain.

In 1934, Lowenberg and Waggoner [43] reported the case of a male aged 34 who for a period of three years presented gradual mental deterioration with episodes of excitement. The examination showed definite intellectual impairment, memory disturbances, confusion, apprehension and apathy. In addition neurological signs were present consisting of hyperactivity of the reflexes, pyramidal tract involvement and mild incoordination. Symptoms of the aphasic, apraxic-asymbolic series were never elicited. General convulsions occurred twice during the course of the disease which lasted about six years. Several days before death there was noted a generalized spasticity, with spasmodic contraction of the extremities. Histologically there were degenerative changes in the nervous system, dominated by the presence of countless senile plaques in all areas of the cortex, the basal ganglia, the cerebellum and the spinal cord. Changes in the fibrils were frequently seen in the neurons of the cortex. The father and three sisters of the patient were affected by the same syndrome, running a clinical course practically identical. Unfortunately, pathological specimens were not available. The authors concluded their unique report proposing an additional subdivision in the classification of Alzheimer's disease, namely, the hereditary type, intermediary between the presenile classical type and the juvenile one.

From the brief survey of the above material we feel that 4 of the 10 cases reveal among other things insufficient pathological changes to warrant a diagnosis of Alzheimer's disease. In the Schnitzler and Lowenberg-Rothschild cases only one of the two components of Alzheimer's condition was present, namely, the neurofibrillary changes in the former and the senile plaques in the latter. In Lafora's case neurofibrillary alterations and senile plaques were scarce. In Weiman's material while senile plaques were absent there were complications represented by advanced calcification of the nervous tissue and marked arteriosclerosis. Moreover, in these four patients the clinical manifestations were far from characteristic of Alzheimer's disease. They rather pointed to a schizophrenic state in Lafora's and Lowenberg-Rothschild's cases and to some sort of an unclassified organic psychosis in the other two. Focal signs were lacking in Schnitzler's and Lafora's patients, whereas in Weiman's case, they were present in atypical form. In this last case the clinical data and the course did not

justify the diagnosis of Alzheimer's disease, as Kraepelin himself pointed out at the discussion following the presentation of the case. These four cases, therefore, do not seem to us to possess either the typical pathology or the clinical features to warrant their inclusion in the so-called juvenile type of Alzheimer's disease.

Three out of the remaining six reveal beyond doubt a characteristic pathology. They are the cases of Barrett, Malamud and Lowenberg, Lowenberg and Waggoner. However, Barrett's case, as also Grünthal pointed out, should be considered unusual in its clinical presentation to fit within the limits of classification of Alzheimer's disease. Furthermore, the nervous symptoms and the pathological findings in the spinal cord were suggestive of amyotrophic lateral sclerosis, a condition in which according to Bertrand and Bogaert's [10] investigations, senile plaques and neurofibrillary changes are frequent. The doubt cast on Barrett's case as to the diagnosis of Alzheimer's disease seems to us legitimate.

The young patient reported by Malamud and Lowenberg presented a symptomatology of psychotic behavior associated with mental deficiency which did not correspond to the clinical picture of Alzheimer's disease. The absence of focal cortical signs, the uncharacteristic mental picture, the course interrupted by a marked improvement which lasted four years are considerable deviations from the classical form.

Therefore, considering, as stressed above, the inadequacy of the pathological criteria and the importance of the clinical data in establishing the picture of Alzheimer's disease, we feel that much caution is necessary in referring to these two cases as juvenile forms of Alzheimer's disease.

As for the autopsied case of Lowenberg and Waggoner the same objections may be raised, based on the absence of focal cortical signs. On the other hand, since heredity of similar type has not been previously observed in such a condition, the appearance of the same disease in five members of a family and in two generations is an element of such importance as to justify temporarily our refraining from an opinion concerning both the diagnosis and the attempt at a further subdivision of the diagnosis of Alzheimer's disease in an intermediary type with hereditary trends.

In the so-called juvenile form there remain, therefore, only three cases of the 10 reported; those of Perusini, Urechia-Danetz, and

Schottky, in which the features were definitely typical of the disease from both the pathological and clinical viewpoint.

Our case falls evidently within this last group. Our patient showed from the clinical viewpoint the three clinical components of Alzheimer's disease with a good deal of the symptomatology referred to regional localization. The intellectual impairment was severe and showed the well known type found in Alzheimer's disease. The multiplicity of the focal signs along with the alteration of the speech mechanism were all well exemplified. Convulsive seizures were evident toward the end stage. The neurological signs were more discreet; among the prominent findings were the hyperactivity of the reflexes, rigidity, tremor and spastic contractures. The clinical course and the progression with rapid and severe mental deterioration were quite striking and evidently corresponding to the course of Alzheimer's disease. Likewise the pathological findings of senile plaques and Alzheimer's neurofibrillary changes extremely diffuse and in large numbers throughout the brain doubtless confirm the clinical diagnosis of Alzheimer's disease.

Including the author's case, there are therefore four cases of Alzheimer's disease in which together with a characteristic pathology, all the clinical features but the age correspond to the classical conception of the malady. These cases fall between the late fourth and the beginning of the fifth decade, at an age somewhat prior to the presenile period. This margin is evidently too narrow to justify its differentiation into a nosological variety of a " juvenile type."

Much speculation has been offered by the authors who claimed to have proved the existence of a juvenile type of Alzheimer's disease. As a matter of fact, the occurrence of the disease as early as the second or third decade of life leads one to doubt whether the condition is related with senility. The assumption of a variety of factors in the etiology of the disease should be more convincing. However, such an important assumption, we feel, is scarcely warranted on the basis of a critical analysis of all the elements of the question above reported. The whole problem of etiology of Alzheimer's disease is as obscure as it was 25 years ago. The only certain new knowledge is that different etiologic agents may produce the pathological features of Alzheimer's disease, which are far from being pathognomic.

SUMMARY.

1. Alzheimer's disease is to be considered up to the present as a definite clinico-pathological entity. Its pathology is not pathognomonic, the clinical data being therefore essential for the classification of cases into Alzheimer's disease.

2. The subdivision into a juvenile form of Alzheimer's disease does not seem as yet justified in its material presentation. Of 10 cases, reported in the literature, occurring at an age prior to the presenile stage, seven presented either insufficient pathological and clinical elements or typical pathology but non-characteristic clinical symptoms. Their inclusion in the group of Alzheimer's disease, cannot therefore be made without unduly stretching the original conception of the malady.

3. In addition to the case described in this presentation, three others have been reported in the literature of typical Alzheimer's disease from both the pathological and the clinical aspects, in which the age limit varied at the most between 37 and 41 years. The narrow variation of the age limit and the small number of these cases justifies, we feel, our conservative attitude toward the creation of a nosological variety termed "juvenile form of Alzheimer's disease."

4. The doubt cast on the generally accepted conception of Alzheimer's disease as a presenile psychosis, doubt based upon the occurrence precisely of the disease in its so-called "juvenile form" is therefore somewhat premature. Additional evidence is needed for such a conclusion.

5. A report of a case, in which all clinical and pathological data exclusive of the age, correspond to Alzheimer's disease, illustrates the expressed ideas.

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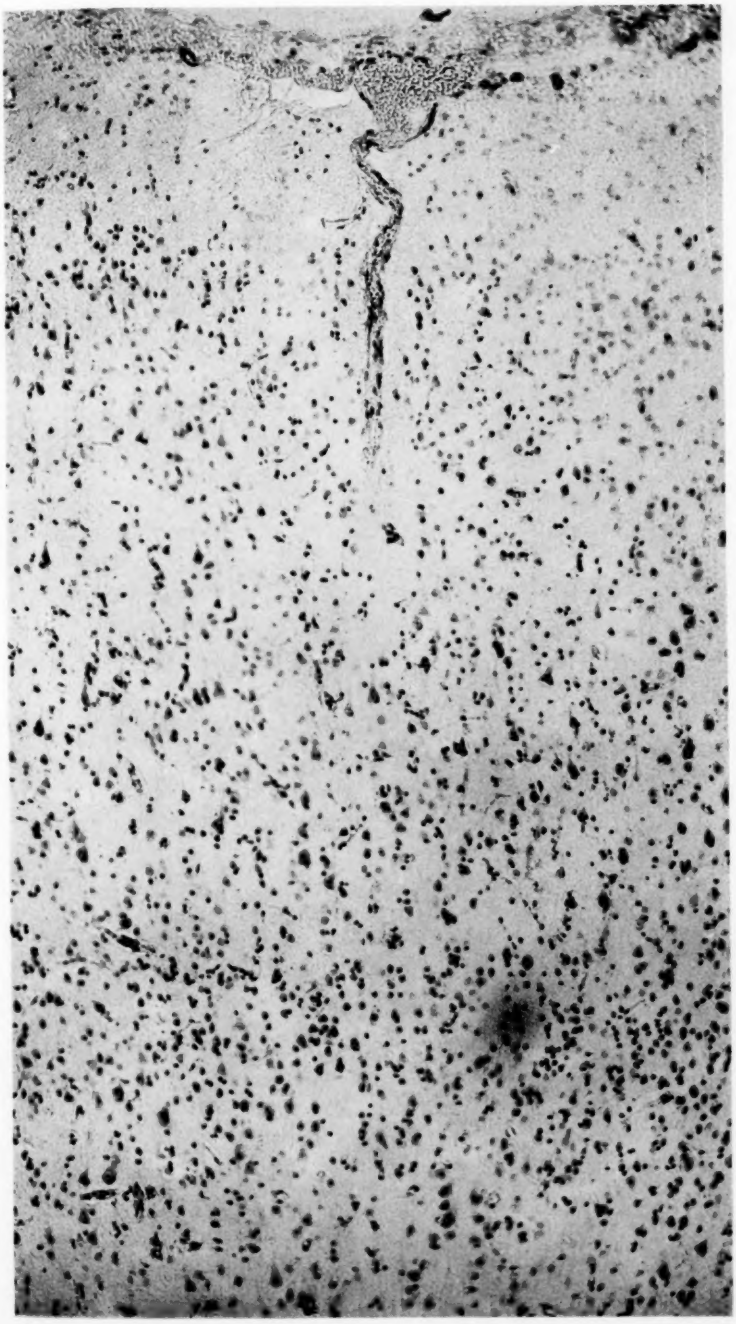

FIG. 1.—Atrophic Cellular Changes Particularly Pronounced in the External Layers of the Cortex. Frontal Region. Nissl's Stain. × 120.

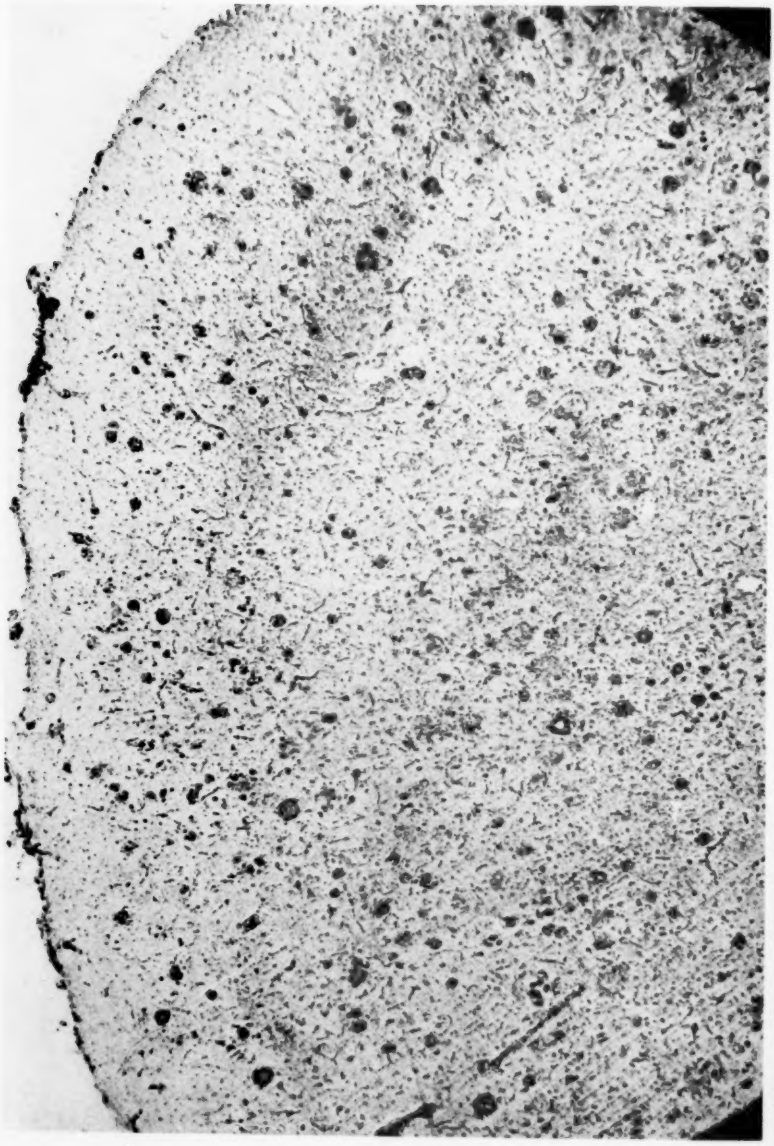

FIG. 2.—Senile Plaques Diffusely Distributed in the Cortex. Frontal Region; Hortega's Method. ×75.

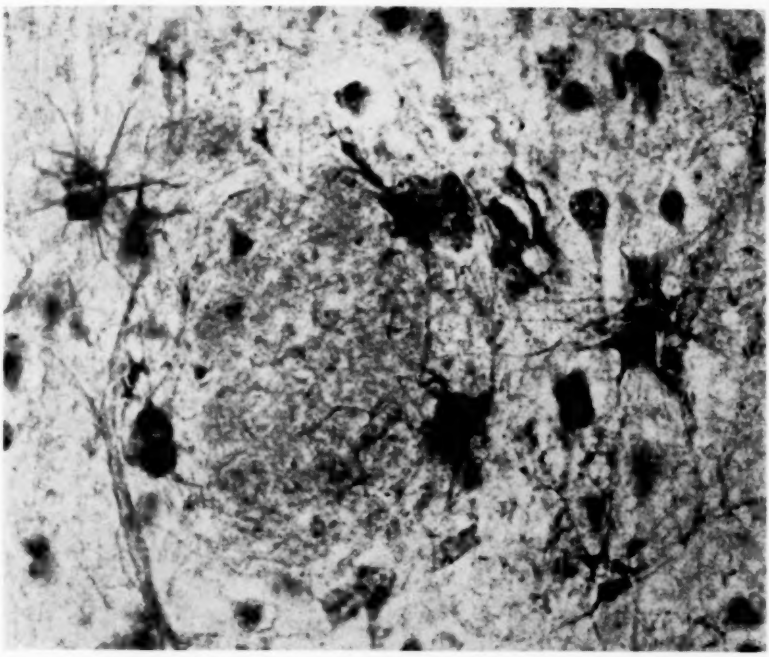

FIG. 3.—Macroglia Reaction Around the Plaques; Parietal Region; Cajal's Gold Sublimate Stain. × 650.

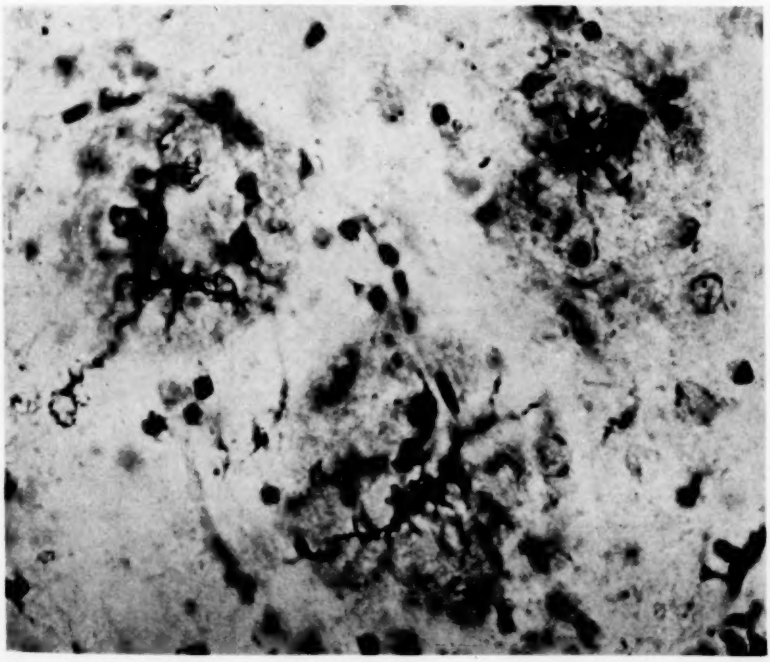

FIG. 4.—Microglia Reaction Within the Plaques (Hypertrophic Degenerative Forms). Frontal Region. Hortega Stain. × 650.

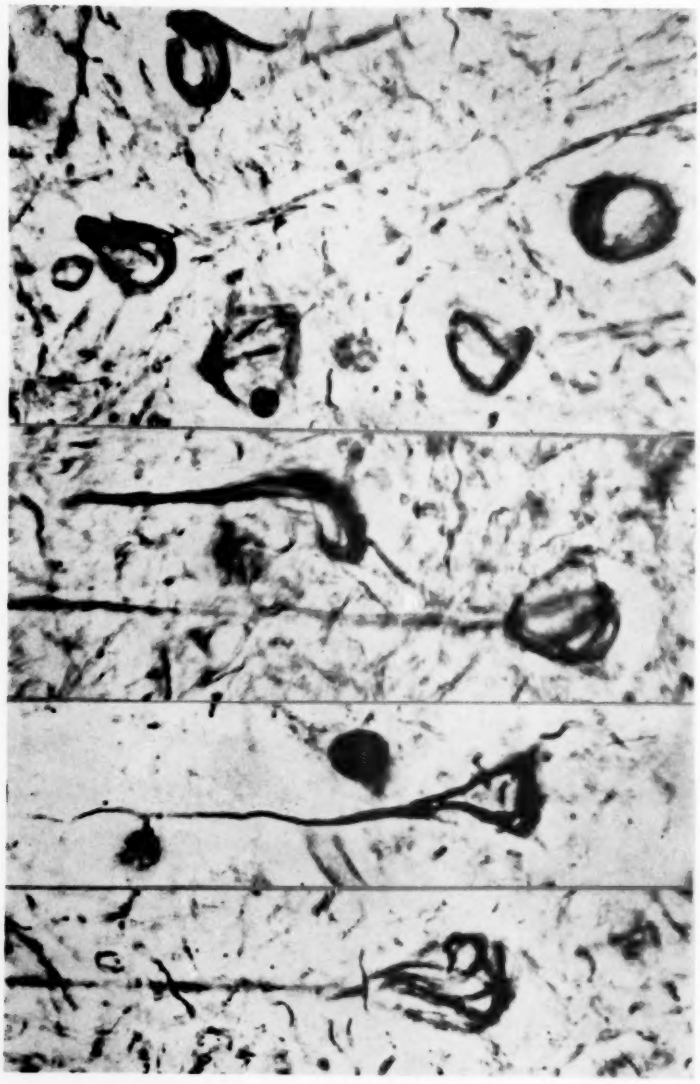

FIG. 5.—Various Aspects of Alzheimer's Neurofibrillar Disease of the Nerve Cells. Frontal Region. DaFano's Modification of Bielschowsky's Silver Method. × 1000.

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SLEEP INDUCED BY SODIUM AMYTAL, AN ABRIDGED METHOD FOR USE IN MENTAL ILLNESS.*

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INTRODUCTION.

Perhaps the greatest difficulty encountered in the treatment of patients with psychoses is the establishment of rapport between the patient and the therapist. That rapport is essential for successful therapy, whether psychotherapy, chemotherapy, endocrinotherapy or any combination of them, seems to be an acceptable premise.

Because of the importance of psychotherapy (when used in its widest connotation it embraces all approaches, namely: readjustment, reeducation, reassurance, persuasion and psychoanalysis) in treatment with a hypnotic and also because of the difficulty in applying it in the psychoses, I sought a chemical agent that would so condition a patient as to make him accessible and perhaps more amenable to suggestion. It is recognized that there are patients

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with whom superficial, conversational rapport is comparatively easy to establish, but frequently persons are not open to suggestion even after chemotherapy has been applied.

SODIUM AMYTAL.

The drug used almost exclusively was sodium amytal (the sodium salt of iso-amyl-ethyl barbituric acid). It was first prepared and used in animals by Page and Coryllos [10] in 1926.

Zerfas and his associates [19] were the first to use sodium amytal intravenously for surgical anesthesia in man, and Bleckwenn [1] was the first to report on the use of the drug in psychoses.

Zerfas [18] stated that when a solution of sodium amytal is left standing the barbituric acid ring breaks open with the elimination of carbon dioxide, forming iso-amyl-acetyl-urea. This latter product further breaks down, forming iso-amyl-ethyl-acetamide, ammonia and carbon dioxide. Boiling is as destructive as standing at room temperature.

Campbell and Shonle [3] found no trace of sodium amytal in the urine after large doses were given intravenously. The above investigators were unable even to detect any of the three decomposition products or any unknown constituents. Herwick [6] reported that amytal is " quantitatively destroyed " in the body, no trace of it appearing even in the first 12 hours; this is in contrast with the appearance of barbital in from 15 to 30 minutes after intravenous administration in dogs. Koppanyi and Krop [8] stated that the excretion of amytal in humans is only from 3 to 8 per cent.

TECHNIQUE.

The following procedure has been followed: (a) The patient is studied to secure a fair knowledge of his premorbid personality and of events which led to the breakdown. (b) As much rapport as possible is established prior to the institution of treatment. These two requirements seem to be essential, for, as will be stressed later, psychotherapy, which is probably one of the most important factors in bringing about a favorable result with sodium amytal treatment, can then best be used.

Although one cannot say in advance with certainty how each individual patient will react to the sleep treatment, it is fair to

assume *a priori* that patients with manic and perhaps also catatonic excitement will need large doses for long periods of time, while hebephrenics and depressed patients will probably need smaller doses for shorter periods of time. To the latter group will probably belong patients with psychopathic personalities and reactive depressions.

Temperature (preferably rectal), pulse, respiration, and blood pressure readings are taken for a few days prior to treatment with hypnotics to determine the average variation. Then the patient is secluded in a quiet room and given 3 or 6 grain doses in order to determine whether there is any idiosyncrasy toward the drug. The patient should not be awakened at any time. Feedings of semisolid food are usually given when the patient awakens spontaneously; an ample intake of fluid is essential; if there are no contraindications in the nature of toxic reactions, and temperature, pulse rate, respiration rate and blood pressure readings are normal, the patient is given sodium amytal by mouth either in capsules or by putting the powder in orange juice. To make sure of proper gastro-intestinal elimination and to prevent complications, daily enemas are given. The dose of sodium amytal is regulated according to the patient's response. If a small dose keeps him asleep for from four to six hours, there is no need to increase it. It will be observed, however, that a dose which has usually kept a patient soundly asleep for a certain length of time will be insufficient to bring about the same effect later.

It is important to watch the patient in order to determine when the most favorable change occurs; this lucid interval should be used for psychotherapy (some form of suggestion).

The duration of treatment will depend on the response of the patient. The moment the first contact is established, psychotherapy should be used vigorously in spite of the fact that this means interruption of sleep.

If rapport cannot be established, it may sometimes be necessary to increase the dose of sodium amytal and the frequency and duration of the treatment in order to obtain it. Sometimes when previously quiet patients become disturbed during sodium amytal treatment, it is best to withdraw medication for a short time for the disturbance is no doubt a toxic reaction, but this disturbance is no indication for stopping medication altogether. I know of no

sign for stopping medication except perhaps severe shock or any extreme physiologic change, for example, hyperthermia of 106° F.

There seems to be no need for intravenous administration of the drug unless quick action is desired or one deals with an uncooperative patient who cannot be induced to swallow capsules.

The question whether a patient should be told about the treatment prior to its induction depends on his condition. It is useless to talk to a stuporous catatonic, excited manic or detached hebephrenic patient. It is sometimes dangerous to talk to a paranoiac. Other patients may and should be talked to when they are cooperative.

ANALYSIS OF RESULTS.

A. Dosage.

The largest single dose given by mouth was 24 and by rectum 27 grains. The smallest daily dose given was 3 grains; the average dose was slightly over 13 grains. No hard and fast rule can be set down for dosage; one must be governed by the condition of the patient. It should be borne in mind, however, that at no time is it desirable, except with very disturbed patients, to obtain deep narcosis. The objective should always be to keep the patient in a twilight state in order that psychotherapy may be used to the best advantage. On the same principle one cannot predict the length of treatment, nor should one be governed by the total intake. In my series of cases, one patient received as much as 1410 grains; another took as little as 18 grains during a period of treatment. The longest period of sleep was 27 days; the shortest was 3; the mean was slightly over 11 days. The mean for the total intake of sodium amytal was 358 grains; the smallest intake per day was 3, the largest 117 grains. The ages of the patients varied from 16 to 66 years; the mean age was slightly over 27.

B. Physiologic Changes.

Observations of physiologic changes were restricted to temperature, pulse and respiration rates, and systolic, diastolic and pulse pressures; these were studied and compared according to the duration of treatment and the quantity of drug consumed.

The mean temperature changes remained uniformly independent of the duration of treatment. An increase was shown, however,

in pulse rate and in both the systolic and the diastolic pressures. The mean increase in the systolic pressure is probably quantitatively greater.

The mean upper and lower limits ("Range") in the group treated for a short period resembles those of the group treated for a long period. The highest recorded temperature of 106° F. occurred in a patient treated for less than 10 days.

If the patients are divided into two groups according to the quantity of drug consumed during the entire period of treatment, the difference in the physiologic changes between those who received up to 300 grains and those who received above that amount is restricted to the mean readings of the pulse, systolic and diastolic pressures. On studying the "Range" in each group one finds that the difference is insignificant in spite of great difference in dose.

Table I contains the mean highest and lowest physiologic values of temperature, pulse and respiration rates, systolic, diastolic and pulse pressures observed on the second day of treatment. The second day was chosen because on this day the greatest number of toxic reactions occurred. From study of Table I in which the dose and the day of recording are controlled—the only variation is the quantity of sodium amytal on the preceding day and the particular type of mental illness—one sees that fluctuations in the physiologic values mentioned are independent of the amount of drug consumed.

Summarizing, one may say that the following conclusion is justified: The response to the drug varies with each individual patient; neither the quantity administered nor the duration of treatment is a necessary determining factor in the occurrence of toxicity. Thus, some patients may receive enormous doses and be kept asleep for long periods of time without many appreciable toxic symptoms, while others with small doses and short periods of treatment may evince marked toxic symptoms.

As an illustration of this the following cases may be cited. L. S., who received 2679 grains of sodium amytal during 49 days with a rest interval of 28 days did not present any toxic manifestations; another patient, P. S., began to show toxic reactions on the third day of treatment after having received only 33 grains on the two preceding days. The highest physiologic values on the third day were: temperature, 104.8° F., pulse rate, 128, respiration rate, 24,

TABLE I.

MEAN PHYSIOLOGIC VALUES ON THE SECOND DAY IN 58 PATIENTS TREATED 73 TIMES, GROUPED ACCORDING TO THE TOTAL INTAKE OF SODIUM AMYTAL ON THAT DAY.

Grains.	Temp.	Pulse rate.	Resp. rate.	Syst. blood press.	Diast. blood press.	Pulse press.	No. of pts.	Temp.	Pulse rate.	Resp. rate.	Syst. blood press.	Diast. blood press.	Pulse press.
0-9	98.2	85	20	95	69	26	4	97.8	71	18	97	67	30
10-19	98.8	87	20	105	73	32	22	98	80	19	101	74	27
20-29	98.7	98	22	107	75	32	16	98.2	84	19	106	73	33
30-39	98.9	91	20	105	72	33	21	98.1	78	19	104	71	33
40-49	99.2	101	22	120	76	44	5	98.6	92	20	104	80	24
50-59	98.4	80	22	108	72	36	1	97.0	72	20	108	72	36
69-69	99.8	102	21	108	72	36	2	99.4	98	18	104	72	32
70-79	...	...	..	...	..	..	..	...	..	..	...	..	..
80-89	98.8	94	22	97	76	21	2	98.8	90	21	93	76	17

and blood pressure, 130 systolic and 80 diastolic. This patient also had a chill and was cyanosed. That his reaction was not due to any factor other than the drug is convincingly suggested by the fact that the physiologic values became normal two days after withdrawal of the drug, and that four days after the drug was resumed the patient again presented toxic manifestations; this time the temperature was 106° F., the pulse rate, 120, and respiration rate, 28; there were also a severe chill which lasted for 50 minutes, considerable coughing, cyanosis and emesis. During the four days preceding the appearance of these symptoms the patient received 111 grains, or an average of about 28 grains per day. The temperature, pulse and respiration rates and blood pressure returned to normal after withdrawal of the drug. Physical examination on both occasions failed to reveal any abnormal signs.

In seven patients, daily white blood cell counts and differential counts were made prior to, during and after treatment. The changes observed are too insignificant and variable to justify any conclusions.

Strom-Ölsen [14] stated that leukocytosis is the rule during somnifene treatment. Wyler,[17] using somnifene, reported that an initial leukopenia is followed on the third day by leukocytosis which lasts through the course of treatment; he reported leukocytosis as high as 31,000. My highest count, in only one patient, was 16,500; this occurred only on one day, after which the count dropped sharply. None of my patients showed an early leukopenia, a condition which was claimed by Wyler [17] to occur invariably.

C. Chemical Changes.

Determinations were made of the hydrogen ion concentration, carbon dioxide and either cholesterol or nonprotein nitrogen on 12 patients before, during and after sodium amytal treatment. A two-day control period before and after the treatment was used. Several patients were treated with other barbiturates and chemical studies made.

Two samples of blood were used in each determination, and the mean reading was recorded. The determinations were made according to the methods of van Slyke for carbon dioxide, Meyer and Nuntwyler for hydrogen ion concentration, Koch and McMeekin for nonprotein nitrogen and Bloor for cholesterol.

From study of the results one sees that the highest actual values of hydrogen ion concentration, carbon dioxide, nonprotein nitrogen and cholesterol before, during and after treatment, respectively, are as follows: hydrogen ion concentration, 7.45, 7.56 and 7.52, carbon dioxide, 66, 74 and 70, nonprotein nitrogen, 37, 37 and 38, and cholesterol, 200, 225 and 244.

Comment.—On the basis of these figures one may say that the changes in hydrogen ion concentration, carbon dioxide, nonprotein nitrogen and cholesterol values are too slight and variable to justify any conclusions. The hydrogen ion concentration values seem to vary correspondingly with the carbon dioxide in all but three cases; a lowering of the hydrogen ion concentration in the face of increased carbon dioxide is due, according to Rakeiten and his associates,[12] to depression of the respiratory center.

That the effect of sodium amytal is not due to the sodium radical is apparent from the fact that the hydrogen ion concentration of the blood was not affected toward the alkaline side; on the contrary, the blood became slightly more acid. The slight acidosis may be due, according to Bourne, Bruger and Dreyer,[2] to considerable respiratory depression. According to other authors the acidosis may be due to anoxemia and to increase in lactic and phosphoric acid, which is found in narcosis.

D. Toxic Manifestations.

All the toxic manifestations have been recorded, and were: Nausea, dry throat, mucus in throat, dysphagia, headache, dizziness, blurring vision, emesis, thick speech, cough, hiccough, cold and clammy feeling, cyanosis, chill, convulsions, excessive perspiration, skin rash, edema of lids, urinary retention, oliguria, urinary incontinence, fecal incontinence, highest temperature, lowest temperature, highest pulse rate, lowest pulse rate, highest respiration rate, lowest respiration rate, highest systolic blood pressure, lowest systolic blood pressure, highest diastolic blood pressure, lowest diastolic blood pressure. If urinary incontinence is to be regarded as a toxic manifestation, (Kläsi[7] referred to such incidence in his article) it occurred 79 times in patients who had previously not been incontinent. Next in order was emesis, which occurred 38 times.

The following physiologic values were above the mean value: temperature, both highest and lowest (highest mostly on the fifth

and lowest on the second day), pulse rate, respiration rate, highest systolic pressure and highest and lowest diastolic pressure. Another toxic manifestation which occurred frequently was cyanosis. Mucus in the throat, probably due to diminution of the cough reflex, occurred mostly on the second day. In only one of my cases was there oliguria, and in none, anuria. Anuria was reported by Stuurmann [15] and Demole,[4] who used somnifene, as occurring within the first 24 to 36 hours. I found no albuminuria and only once urinary retention, while Strom-Ölsen,[14] who used somnifene, reported albuminuria and retention in almost 26 per cent of his cases. None of my patients had ketosis. However, I see no objection to using a combination of insulin and glucose as suggested by Strom-Ölsen.[14] On studying the distribution of the toxic symptoms according to the day of sleep one finds that the greatest number occur on the second day, with a downward curve later, so that on the sixth day the number of toxic symptoms is barely half of those on the second day; by the tenth day there are only one-third. As mentioned previously, I discontinued treatment only once in a patient whose temperature rose to 106° F. No other toxic symptoms were alarming and were not considered sufficient indication for discontinuing treatment in spite of the fact that some patients had such low readings in temperature, pulse rate and respiration rate as 96.4, 48 and 12, respectively.

Some comment should be made about convulsions. I believe that the seven convulsions which occurred were due to rapid withdrawal of the drug. Convulsions may also occur when the dose is markedly and drastically reduced. In the case of one patient, E. M., who was treated twice for 28 days, convulsions developed on the 28th day after the drug had been reduced by 60 grains from the preceding day. Convulsions do not necessarily occur on the day following withdrawal of the drug. Sometimes they are delayed, on one occasion for as long as nine days. The convulsions can be stopped by resumption of administration of sodium amytal; I have seldom resorted to that, however, preferring to use morphine and epinephrine. Other symptoms that may require intervention are: cyanosis, which improves with some cardiorespiratory stimulants; vomiting, which is controlled with atropine as suggested by Demole,[4] and hiccough, which may require the use of compound spirits of ether. In this connection it is interesting that Lundy [9]

has used sodium amytal in obstinate cases of hiccough with good results. Urinary retention may call for catheterization. Shock may necessitate the use of an antidote: picrotoxine, recommended by Wagner,[16] or coramine, recommended by Reese.[13]

E. Rôle of Psychotherapy.

Psychotherapy, as mentioned previously, is important in the treatment for psychoses after rapport is established. Material can be obtained from patients under the influence of sodium amytal which may lead to a better understanding of the breakdown and sometimes may establish a psychogenic origin of the particular mental illness. At this stage, when the patient is somewhat more alert, more eager to be helped and more sure and less fearful of his surroundings, suggestion is of the utmost benefit. Certain patients are most alert on certain days. I have referred to this as the "best day." The greatest number of "best days" have appeared on the sixth day of treatment, and the next greatest number of "best days" on the fifth and eighth days. As the "best day" I designate the day on which the patient is alert and in good contact, eager to be helped, eager to converse and exhibits a logical and coherent stream of talk. It is on such days that I have stopped medication abruptly and allowed the patients to be up and about. On several occasions when these "best days" were not heeded and the treatment continued, the result was invariably unfavorable. It is during the "best days" that psychotherapy should be accentuated. Contact should be secured prior to the occurrence of the "best day" and is usually established in previously inaccessible patients on the second or third day.

Cases of psychoses of similar classifications were divided into two groups. In one group the patients were treated with sodium amytal in doses comparable with those administered in group 2, but without psychotherapy. In group 2 psychotherapy was used. The group with psychotherapy invariably showed from 50 to 100 per cent improvement as compared with slight or no improvement in the other group. This, however, should not be interpreted to mean that the application of psychotherapy will invariably bring good results; that this is not the case will be seen when results of the responses of patients are analyzed.

F. Reactions of Patients with Various Types of Mental Illness.

Of 58 patients treated, 10 were treated twice, one was treated three times and one four times. All cases fall into 17 different categories of which the largest number is made up of hebephrenic psychoses and the smallest number of manic-depressive (mixed type), presbyophrenic, organic and somatic psychoses. Arbitrarily I set four weeks as a time limit for checking the occurrence of improvement. If a patient improved or showed any favorable change after that time, the changes were not attributed directly to the effects of the drug and were not recorded as such.

In evaluating changes in a patient it is sometimes difficult to avoid the subjective element; nevertheless, I have endeavored to be objective and conservative and to designate favorable changes only when they were definite and unmistakable. I accordingly viewed my patients as unimproved or as improved 25, 50, 75 or 100 per cent, the last mentioned including insight and ability to return to previous occupations. The 25 per cent improvement ratio refers to patients who were able to adjust themselves in an institution on a low level. As 50 per cent improvement I designated those who could adjust themselves at home on a comparatively inferior level. As 75 per cent improved were those who recovered completely but lacked insight. On the basis of these designations, of 58 patients who were treated a total of 73 times, 25.8 per cent remained unimproved, 12 per cent showed improvement of 25 per cent, 17.2 per cent improved 50 per cent, 17.2 per cent improved 75 per cent, and 27.8 per cent recovered completely. If one may regard patients with 75 per cent improvement as recovered, the percentage of recoveries rises to 44.8 per cent. The greatest number of recoveries occurred in the group of manic-depressive psychoses. Of 8 manic patients, 4, or 50 per cent, recovered. Palmer and Paine [11] also claimed greatest success with manic patients. In the depressed group, 4 of 7, or 57.1 per cent recovered. In the schizophrenic group the simple and paranoid types gave no recoveries, the hebephrenic group yielded 2 recoveries of 11, or 18.2 per cent, and in the catatonic group 1 of 6 recovered, or 16.7 per cent. The only groups of cases in which complete recovery occurred were the reactive depressions, and the toxic and somatic psychoses.

In my cases there seems to exist a correlation between recovery and classification of psychosis in the following order: reactive depression, manic-depressive psychosis (excitement and depression), somatic, toxic and hebephrenic psychoses. The catatonic type of schizophrenia will respond best if sodium amytal is given in small doses intravenously, combined with such stimulants as caffeine sodium benzoate, together with psychotherapy when the patient is out of stupor. (A detailed report of this manner of using sodium amytal will be given in a subsequent paper.) Paranoid patients did not yield to treatment probably because psychotherapy for this type was never efficacious. In evaluating the patient's mental state one finds it difficult to bring to light the underlying idea, the premise.

G. Present Status of Patients Six Months to Three Years after Treatment.

In Table II, which gives the present status of the patients, it is shown that only 14 of the original 16, or 24.1 per cent of the total 58, are still in the recovered group. The present status of patients is based on a uniform, post-parole questionnaire, which has been sent to all relatives of the patients, including those who are at present in other institutions. Interviews have been had with relatives and patients when possible. Of the originally 58 treated patients 19 are now considered to be recovered, five having been transferred to this rating from previously unrecovered ratings. Of these five, one is from the previous unimproved group, and the psychosis was of manic-depressive character, in which recovery after a time is to be expected. One patient who is now recovered had been in the 25 per cent column; he was later subjected to another course of treatment with sodium amytal by other physicians, as were also one patient in the 50 per cent and two in the 75 per cent columns.

It may be argued that, if patients with manic-depressive psychoses recover without treatment, why treat them? The answer is: Much time may be saved if the treatment is applied. The following case is typical. F. S., a woman, aged 25 had had one previous attack. After five months' stay she was paroled and three months later was discharged as recovered. She was well for four

TABLE II.

TABLE II.

Status of Patients from Six Months to Three Years After Treatment.

Present status.* Classification.	Initially unimproved.				Initially improved. 25%				50%				75%				100%			
	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
Schizophrenia, atypical	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..
Schizophrenia, catatonic	1	1	..	..	..	..	..	2	..	..	..	..	..	..	..	1	..	..	1	..
Schizophrenia, hebephrenic	4	..	..	..	..	..	..	..	..	2	..	1	..	..	..	2	..	1	1	..
Schizophrenia, paranoid	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Schizophrenia, simple	..	..	..	..	..	3	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Reactive depression	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
Manic depressive psychoses with schizophrenic features	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..
Manic depressive psychoses: Manic type	..	..	1	..	..	..	..	..	..	..	1	..	..	1	1	..	..	..	4	..
Manic depressive psychoses: Depressed type	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	3	..
Manic depressive psychoses: Mixed type	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Involutional psychoses: Melancholia	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..
Senile psychoses: Presbyophrenic type	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Psychoses with organic changes of the nervous system	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Psychoses with somatic diseases	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..
Psychoses with infectious diseases: Post infectious psychoses	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Psychoses with mental deficiency	1	..	..	..	..	..	..	..	..	1	..	2	..	..	..	..	..	..	..	..
Undiagnosed psychoses	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Totals	12	2	1	..	..	4	1	2	..	5	1	4	..	4	2	4	..	2	14	..
	15				7				10				10				16			
	Unimproved.				Improved.				Recovered.				Relapsed.							
Totals for present status	12				17				19				10				58			
Percentage	20.7				29.3				32.8				17.2				100.0			

* A, unimproved; B, improved; C, recovered; D, relapsed.

months, then relapsed and was readmitted. After a month in the institute she was subjected to sleep treatment, two weeks later she was paroled. At present she has been well for nine months.

In evaluating the present status of patients, the original plan of grouping them according to percentage of recovery has been discontinued, and patients are regarded as either unimproved, improved, recovered or relapsed. The last designation is applied in the case of a previously improved or recovered patient who has reverted to his previous condition. The improved group at present numbers 17 patients, or 29.3 per cent. The unimproved group, except for one patient who recovered and two who have improved, has remained practically unchanged. The group of relapses has been recruited thus: 4 from the 75 per cent column, 4 from the 50 per cent column and 2 from the 25 per cent column (Table II).

Table III which deals with the age distribution of the patients

TABLE III.

AGE DISTRIBUTION OF TREATED AND NON-TREATED PATIENTS.

	Treated patients.		Non-treated patients.	
Age.	No.	Percentage.	No.	Percentage.
10-19.....	8	13.8	60	15.8
20-29.....	32	55.2	152	40.0
30-39.....	12	20.7	88	23.2
40-49.....	5	8.6	36	9.5
50-59.....	0	0	34	8.9
60-69.....	1	1.7	10	2.6
Total.....	58	100.0	370	100.0

treated (the youngest was 16 and the oldest 66) is a fair representation of the average run of the population of the Psychiatric Institute. These tables show that the patients treated were not a specially selected group but represent fairly the general types of mental disease presented by patients in the institute.

DISCUSSION.

From my observations I am led to conclude that Kläsi [7] was correct in saying that neither the depth of narcosis nor the duration of treatment is important, but rather the twilight state which enables the physician to establish rapport with the patient and

administer psychotherapy. *Dammerzustand* is therapeutically favorable because in that state patients are more or less freed of inhibitions, antagonisms, negativisms and other expressions that are not conducive to the establishment of rapport. I therefore do not believe that large doses and long duration of treatment are necessary in non-agitated patients. It has been the experience of almost every worker with sodium amytal, especially of those who have used it by the intravenous method, that following the administration of the drug the change in the patient's reaction and response is almost instantaneous. To a less striking degree this is also true when the drug is given by mouth. These favorable reactions should be used for the establishment of rapport.

Patients with the same classification of psychosis and of the same group were treated with similar doses, under identical conditions, with the exception that one group received psychotherapy and the other did not. Some of the patients to whom psychotherapy was applied improved or recovered while few or none of the others did.

It is futile to expect rapport on the first or second day. Therefore it is best to give in the beginning, if there are no contraindications, somewhat larger doses and toward the third or fourth day to decrease the dose, because that is when the " best day " is apt to occur. The advantage in following this procedure is that physiologic rest has been attained; by that time a twilight state may be maintained for a day or two, giving opportunity for the psychotherapist to approach the patient. Once contact is established and mechanisms are evoked, psychotherapy should be intensive. If the examiner is of the opinion that after a day of continuous contact the patient is coherent, logical and shows an interest in his own welfare, drastic withdrawal of medication is advisable. Convulsions are apt to follow; they are not a danger signal but merely symptoms of withdrawal; they are most satisfactorily treated by the administration of epinephrine 7 minims and morphine ¼ grain, These convulsions, which I term a " shock reaction " of the body, are frequently beneficial, especially if until that time the patient had not recovered completely.

In the cases of the 58 patients treated, the drug was withdrawn rapidly in nine; six patients had convulsions (one had two), and in three cases no convulsions followed, which indicates that the

reaction to the drug is at least partially individual. Of the six patients who reacted with convulsions, three had improved only slightly prior to the time when the convulsion occurred; they showed definite signs of recovery almost immediately after the convulsion.

On the basis of this observation one patient was exposed deliberately to convulsions by rapid withdrawal of the drug. This patient had an atypical schizophrenia. She reacted favorably for several days after the convulsion and then relapsed into the original condition.

Although Kläsi [7] stated that cardiac decompensation and renal insufficiency are contraindications to the use of somnifene narcosis, Dozy [5] used the drug in such patients without any apparent ill effects. I do not believe as Kläsi [7] did that the use of the drug should be discontinued when some toxic manifestations, such as vomiting or hyperthermia (99.5° F.), occur. In only one instance of the 73 courses was the treatment discontinued; in that case the patient reacted with hyperthermia of 106° F., which was undoubtedly due to the drug, for the temperature dropped to normal as soon as the drug was withdrawn. The reason for pyrexia with sodium amytal is probably the same as that advanced by workers with somnifene; namely, depression of the function of the heat-regulating center.

My results proved that hypothermia occurs as frequently as hyperthermia, that variations in temperature may occur also either prior to or after the treatment and that these fluctuations of temperature are independent of the depth of narcosis and the duration of the treatment.

The custom of putting mental patients to sleep for a definite period—differing with each investigator—for 5 to 7, 7 to 10, or more than 10 days, and of having the patients sleep continuously is not correct and should not be followed. An abridged method, that is, one which entails flexibility to permit the interruption of sleep for the purpose of using psychotherapy and the discontinuation of the treatment regardless of the number of days of sleep, when the patient had shown a good response for at least one day, is suggested.

To summarize, I suggest that patients with psychoses of manic-depressive, reactive depression or hebephrenic and catatonic schizo-

phrenic types, as well as patients with somatic and toxic psychoses may be given a trial with the drug. Patients with paranoid schizophrenia are, in my experience, refractory to treatment. Patients with simple schizophrenia, mental deficiency and melancholia have little chance of improvement.

SUMMARY AND CONCLUSIONS.

The use of sodium amytal for the induction of sleep in psychotic patients has been discussed. Fifty-eight patients were treated 73 times. Several were treated as controls with amytal and barbital, but neither of these drugs was found to be as effective or as little toxic as sodium amytal. Although sodium amytal is apt to produce toxic manifestations, in only one case were these sufficiently severe to warrant discontinuation of the treatment. There is no correlation between the number of treatments with sodium amytal and the toxic manifestations. No direct relation was found between age and response to treatment. Reaction and response to the drug depends on individual constitution and is independent of quantity of drug consumed and duration of sleep. There were no fatalities.

Patients tend to react differently on certain days, and the days on which they react most favorably, arbitrarily designated as "best days," should be used for intensive psychotherapy; the latter seems to be essential for favorable results. Every form of psychosis except perhaps that of paranoid schizophrenia should be given a trial with the abridged method of use of sodium amytal as has been described. It is suggested that recovery does not depend on the depth of narcosis nor the duration of sleep but on the twilight state which enables the physician to use psychotherapy effectively.

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THE MECHANISMS OF PSYCHOALLERGY.*

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I.

The specific domains of biology and abnormal psychology seem to be separated by unknown entities. Although the two studies are connected by the common denominator of the living cell, some observers look upon the study of psychology as being a bit metaphysical in nature. Biology, outside the realm of the psychosomatic relationships, lends itself readily to calibration. It would be a decisive advance in our knowledge of these subjects if an interchangeable theory were available for these two fields of scientific endeavor. This appears to be all the more desirable because of the fact that there is much difference of opinion between the organic and functional disturbances and the interpretation of clinical findings.

Paracelsus was one who realized the need for the study of the psyche as shown by his concepts of disease in the doctrine of the "*quinta essentia.*" Thus, the "*ens spirituale,*" or psychic phase, came into being.

Other astute students have followed this master down through the annals of scientific progress. Year after year passes by and others continue to record their observations of the emotions and the psyche; yet the possible common tying mechanism is an unknown entity.

Wechsler,[1] in discussing the neuroses, emphasizes the point which I wish to make clear. He states that "it is quite possible, perhaps probable, that all of the physical and most of the psychic manifestations of the neuroses will some day be explained in terms of neurophysiology." He further states that "there is considerable evi-

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dence to warrant such a statement. The close similarity, for instance, between the mental manifestations of organic brain disease and the so-called functional, or better, psychogenic, mental disorders is evidence which cannot be easily disproved." Wechsler thinks that the term "functional" ought to be entirely discarded in the discussion of the neuroses and psychoses, as all general physical and special neural activity is functional in the sense that every organ or tissue, or group of cells has a function which finds expression in activity.

This diversity of opinion, which exists among the various schools of psychology, has been effectively discussed in Professor Clark Hull's recent paper,[2] in which he states that this difference of opinion is a bit characteristic of metaphysical and theological controversy. Such seems to be the case when the subject of emotion is discussed. Volumes have been written and, no doubt, much more important work will appear before this dominant subject is perfectly understood.

What common denominator is available in this search for a solution to the riddle of the laws of psychopathology? Such an instrument would be very effective if it operated along simple lines and followed the laws of biologic activity. An interchangeable modus operandi, which could explain the mechanisms of psychopathology in biologic nomenclature, might give impetus to some stimulating research along new lines of approach.

II.

The idea of an allergic mechanism in the realm of psychopathology is not a particularly new one. Mairet and Pieron [3] used the term "emotional anaphylaxis" as meaning a state of hyperexcitability which takes the form of restlessness or of fear, often going to the extent of delirious hallucinations at the beginning, and revealing itself for a long time by persistent nightmares. These observers have advanced a psychogenic theory for an emotional syndrome which was characterized by: (1) Increase in delirious hallucinations, (2) extreme mental fatigue, (3) headaches aggravated by mental effort.

This is a definite form of psychosomatic upset which any clinician of moderate experience might have observed in certain patients from time to time.

Although the term "emotional anaphylaxis" is an interesting one, it is a misnomer because anaphylaxis is directly associated with the effect of proteins, and thus, by no known facts, do the emotions produce protein shock; rather, it may be the non-protein character of emotional activity that produces a state of allergy via the "H" substance of Lewis.[4]

Moschcowitz [5] approaches the interpretation of the neurotic constitution as being an "allergy to life." He states that a neurosis results from a conflict between environment and the individual in which the equation of the forces of environment is in a delicate balance with the forces of the individual. It is, then, a question as to whether the environment has become more onerous to the individual, more sensitive, or both. Moschcowitz states that one of the most conspicuous symptoms of sensitivity is the overdevelopment of the instincts and the senses. The demand upon the individual for an escape from the realities of his environment "naturally leads to a greater dependence upon one's own inner fires."

Schultze [6] has attempted to prove that the relations between the psyche and allergy are close. He wrote that many of the phenomena observed in allergy are really defense reactions of an excessive degree and biologic in nature; moreover, these reactions resemble the defense mechanisms observed in the case of the neurotic.

In discussing the phenomenon of the "loss of feelings" among psychotic patients, Johnson [7] states that "no explanation can be ventured, but it is our guess that it is the "Stimmung," the pleasant or unpleasant thalamo-splanchnic effects produced by the interpersonal contact which sensitizes us, something in a manner of a photographic plate, to the impinging locale."

Increased emotional force, when applied to a given subject, evidently causes some sort of change in the mechanism of the individual. Much has appeared in the scientific literature to substantiate this hypothesis. Furthermore, a large portion of this emotional force is derived from symbols of action patterns which have conditioned the body. Thus, words, certain environmental setups, various people, any sort of a symbol of an emotional pattern, such as a highly prized letter, and countless other objects and situations, are potential forces which may act upon the individual, if that person has been so sensitized to them.

Let us make a partial review of what allergy, hypersusceptibility, and immunity mean, in order to discover certain points which may help us to understand psychic reactions and their mechanisms.

III.

The reactions of the living cell to injury is either repair of the damage or death of the cell. If the reparative process is favorable, the tissue regeneration is unhampered by excessive scar tissue. This is not the entire story; when tissue is lost, the regeneration that follows is not only sufficient to restore the amount of tissue damaged, but actually results in over-production of this tissue. This is Weigert's Theory of Regeneration of 1896. This is exemplified by the over-production of segments in reptiles, of cell proliferation in granulating wounds in animals and man, and by the formation of keloids and other tumor masses which may result from injury.

What happens when the organism is susceptible to injury? Why does one individual escape harmful stimuli while another succumbs to their effects? What is the end result of the reparative processes when an organism recovers from a stimulus? Does it control, in any manner, the cellular immunity or govern the organism's behavior to further stimuli of the same sort? These are the problems which face us. It is not all stimulus→response. If this were true, the end results could be predicted quite easily. It is the continual change in the very mechanism of an individual who is subjected to stimuli, especially constant stimuli, that must be explained if these problems are to be solved.

In order that any organism may respond to a stimulus, it must first have the property of sensitivity. This stimulus must undergo a change from the afferent to the efferent phase in order that the organism may react to it. What happens when this afferent mechanism becomes too sensitive? When the organism reaches a saturation point, the afferent threshold changes markedly; it is first hypersensitive, then the threshold is raised and hyposensitivity results.

It is this hypersensitivity that I wish to discuss further. According to Anderson,[8] allergy is divided into anaphylaxis, exaggerated susceptibility of an organism to foreign proteins or protein derivative products, and hypersensitiveness, exaggerated susceptibility of the organism to non-protein substances. Either reaction may be natural or acquired.

It is the non-protein allergens which interest us. There are two main schools of thought as to how these phenomena work; the humoral theorists believe that antibodies circulate in the blood stream, and when the antigen or exciting substance contacts them, instant reaction occurs. The cellular theorists, on the other hand, contend that the antibodies are within the tissue cells, and that before a reaction can occur, it is necessary for the sensitizing agent or antigen to become anchored to the cells. Kolmer is of the opinion that these allergic phenomena are due to cellular colloidal reactions and are governed by the laws of complex physical chemistry. However, Anderson thinks that the variations of the vascular, endocrine and nervous systems are all so closely interrelated that it is impossible to separate their integral features. This author goes on to state that "the stress and strain of present day living produces chemical imbalances which not only no longer afford us protection against common susceptibility, but actually aids it by producing sensitizations against things that never before gave us an unpleasant feeling or thought so far as physical discomfort is concerned."

As Kolmer has noted, the lesions of allergy, in man at least, are largely disturbances of the vasomotor system and affect the respiratory, alimentary, and cutaneous systems. Of course, one should not overlook the fact that the vasomotor system is dependent upon the functions of the autonomic nervous system, the endocrine system, the vascular system, etc.

It is well to record that allergy is that condition of unusual or exaggerated susceptibility to substances which are harmless in similar amounts to other members of the same species. Kraus [9] concludes that all alterations, including fatigue and recovery of muscle, wrought in the organism by the blood system, is anaphylaxis in the broadest sense of the word (Richet), or allergy (Von Pirquet and Schick) with respect to the reactivity of the organism. The latter term is comprehensive enough to include all the phenomena of reactivity, in the sense of increase or decrease, dependency upon antigenic or non-antigenic sensitizing factors.

What are these non-antigenic sensitizing factors? To astute students of allergy, it is common knowledge that such physical agents as heat, cold, light and trauma [10] are very important and interesting.

This knowledge may be carried to the realm of the emotions. Da Silva [11] clearly described a case of "emotional anaphylaxis" in a young lawyer who experienced an emotional shock when trying to speak in public. The same author quotes Dupré as stating that emotion sensitizes the nervous system to later emotions and causes emotional hypersensitivity.

Michael [12] calls attention to the clinical study of the chronic urticarias, eczemas and cutaneous pruritus which are elucidated by a study of the psychic state of the patient. He emphasizes the fact that grief, sex conflict, disappointment, worry and other emotional stresses are presumably predisposing factors upon which the allergic state develops. In the discussion of this same paper, Dr. George B. Lake makes the point that the emotions have a powerful influence over all of the ductless glands and the sympathetic system, and that the freest blood supply is in the skin. He states that "it seems, therefore, philosophical reasoning that the emotions should react upon the condition of the skin. The endocrine secretions have a profound effect in controlling the elimination of toxins from the system, and we know how the toxic substances in the blood will affect the skin, so it seems there is nothing esoteric about this reasoning."

Let us review the prevalent opinion of those who study the reaction of the organism to injury. We have stated that, according to Weigert, an organism, when wounded, will have a tendency to overproduce those materials necessary for repair. The surplus repair parts are discharged in the blood stream. These free receptors are termed antibodies, according to Ehrlich's side-chain theory. One should remember that acquired and inherited immunity are different, although both have these antibodies. Another point of importance is the fact that a period of increased susceptibility to infection immediately follows the introduction of a virus or its products. However, this period of susceptibility is followed later by an increase in resistance to the virus.[13]

Thus, any allergen, which causes a reactivity to its noxious substance, is capable of further damaging the organism, especially during this so-called refractory stage before the production of the antibodies has occurred. Decreased resistance to infections or allergens also has been noted following excessive strain and chilling. Likewise, emotional upsets have a tendency to weaken the resistance of the body.

So we note that a definite time, or incubation period is present in order to have an active sensitization to the antigen,[14] which period varies with the different species of animals. Coca [15] states that "the simultaneous injection of more than one antigen in equal amounts does not influence the incubation period of the active sensitization to the different antigens. If, however, a relatively large amount of one antigen is injected 24 hours previous to the usual sensitizing injection of a second antigen, the latter substance is markedly increased."

The same author records that the primary anaphylactic reaction takes place in or on the susceptible tissue and not in the fluids of the body. As to how these changes take place, there are two main theories, the Lewis histamine theory and the membrane hypothesis of Doerr. I refer the reader to the numerous works on this large topic; see the list of references at the end of Coca's article.

No antibodies have as yet been found in hypersensitiveness to infections or infectious allergy, serum disease, contact dermatitis and other clinical manifestations of specific sensitiveness to the non-antigens; in such cases these antibodies may not exist.

IV.

If we assume that emotional stimuli exert an influence on the living organism, we infer that some sort of a measurable reaction occurs. Just as light or heat are non-antigens, psychic stimuli can be regarded as "psycho-non-antigens" or "psychoallergens."

Let me quote some opinions from the current literature to demonstrate how emotional stimuli derange not only the somatic but also the visceral mechanisms of individuals.

Freeman [16] writes that "the fatigued nervous system has the capacity of acting more directly and intensely than the normal one, the inhibitory functions being the first to become exhausted. Just what determines the localization of the neurotic symptoms in this or that organ is often obscure, but sometimes quite evident. An acute infectious disease, an injury, a severe intoxication, any of these may determine the localization of neurotic symptoms. More obscure in the pathogenesis are the visceral neuroses, and most subtle of all are the mental and emotional reactions to fatigue."

Much has been written on humoral disequilibrium and especially the dermatoses which are caused by emotional shocks. Joltrain [17]

presented an interesting case of this recently. Lethal icterus, due to emotion, has been described by Marchiafava;[18] the psychogenic origin of organic diseases has been discussed admirably by Moschcowitz,[19] who includes essential hypertension, Graves' syndrome, gastric and duodenal ulcer, cardiospasm, irritable or spastic colon, and mucous colitis in this list. This observer concludes that these "essentially human diseases rarely occur before the emotive and affective powers are developed, *i. e.*, before puberty, and that their incidence bears a strong relation to world crises or great emotional waves."

C. Lyons[20] produced emotional hypercholesteremia in cats. He obtained an increase of blood cholesterol from 25 to 30 per cent.

Emotional leukocytosis has been studied by Mora, *et al.*,[21] Izquierdo[22] has been able to produce an emotional polycythemia. The blood platelets have been noted to increase in numbers during emotional stress, according to M. E. Field.[23]

Cady[24] writes that suppressed or unrelieved resentment is capable of causing pain in a manner suggestive of a conditioned reflex. He reasons that, from this viewpoint, psychogenic pain must be considered as an emotional release rather than as an escape in the usual interpretation, and not necessarily having a conscious protective object.

Deutsch[25] reported a case of psychogenic fever, and in another paper,[26] observed that induced emotions of fright increased the respiratory metabolism.

W. Brown[27] wrote that "the idea of a sensory experience, such as a feeling of heat or pain, can be intensified and allowed to produce its full effect. An idea of a burn or blister will actually raise a blister in a hypnotized patient, where competing ideas are kept away. Ideas are not mere ideas, they are also forces."

Scala[28] noted that the fear of contracting a disease actually predisposed to it. Many more cases could be cited in which the emotional reactions were the dominating factors.

How and by what means do these phenomena occur? Lumiere[29] states that the immediate effect of emotional factors on the sympathetic system, of any mechanical, chemical, thermic or electric excitation of a nerve, is a drop in the blood pressure due to a marked vasodilatation of the visceral capillaries. Thus, the tissue juices penetrate through the semi-permeable vascular walls, in order

to re-establish the normal pressure. The interstitial and plasmatic colloids, normally separated from each other by the capillary walls, now contact each other in the blood stream. This results in flocculation (proved by mixing the same substrata in vitro). The end results are—(1) disturbance of sympathetic equilibrium causing symptoms of circulatory, respiratory, glandular, secretory, motor and vasomotor disturbances; (2) reduction of the stability of certain humoral colloids which become fragile and more apt to flocculate again; (3) hypersecretion of the glands. Lumiere goes on to say that such colloids, precipitated by emotional shocks, if circulated through hypersensitive organs, result in severe and permanent damage to these organs.

It seems quite clear that any agent that is capable of stimulating an organism so that it responds to the stimulation, must be thought of as being capable of producing a state of susceptibility of the organism. It is when this susceptibility becomes exaggerated that we begin to deal with the pathological aspects of the problem.

Therefore, it seems logical to think of psychic stimuli as being "psycho-allergens" or "psycho-non-antigens" (non-protein in nature).

If we say that an individual becomes hypersensitive to the environment of an irritative mother-in-law, it is the mother-in-law mainly that makes him allergic, so to speak, to the mother-in-law.

If one introduces the psychoallergen of "mother-in-law," a tirade may occur on that subject. The father-in-law, in this particular case, does not precipitate the violent reaction. This response seems to be specific, so that the end result, or psychoallergic manifestation, is caused by the specific psychoallergen "mother-in-law."

How does an individual become hypersensitive? It seems that the modus operandi is the same in psychoallergy as it is in the field of allergy. A person may be immune congenitally to certain psychoallergens; furthermore, he may be able to desensitize himself to them, which is another way of stating that he effects a sublimation or compensation according to the concepts of Freud. Thus, an individual may become hypersensitive to a particular subject which acts specifically as a psychoallergen upon that individual; likewise, he may undergo desensitization by himself by means of the above mentioned processes, or he may be desensitized through the method of psychoanalysis.

Let us assume that we have a new-born individual. So far as we are informed, this infant has never been subjected to any painful emotional stimuli. We may speak of him as being non-psychoallergic. If we subject him to some type of true emotional stimuli for a time, we will note that a state of disintegration of the integrated emotional processes ensues; a state of hypersusceptibility follows. This parallels the refractory period which the immunologists describe. Similar sensitizing processes occur in every case of psychic conflict.

How may we test the veracity of this statement? The mere suggestion of the specific psychoallergen in a hypersusceptible individual brings about an emotional upset. This mechanism is observed in the performance of the various word association tests. The test subject responds only to the specific key words. He reacts this way because he is sensitized to specific psychoallergens, which, when introduced by way of the word association test or by any other means, brings about a definite response which is measurable. The psycho-galvanic reflex, according to the psychoallergic theory, is itself the product of the psychoallergic manifestation. The other phenomena which are observed during reaction, are, likewise, the manifestations of the emotional upset. They, too, parallel the phenomena observed in the field of allergy. Thus the respiratory embarrassment, which the stutterer suffers, is a psychoallergic reaction which may have an inferiority as its basis. The individual who faints at the sight of blood suffers a psychoallergic reaction which can be traced to a specific emotional upset caused by a specific psychoallergen.

The criminal, who kills people without the slightest sign of an emotion, may develop a refractory period and lose his nerve completely. The dipsomaniac seeks a flight from reality in liquor. He does not drink for the sport of drinking; he imbibes because he needs a retreat from the definite psychoallergens to which he has developed a state of hypersensitivity.

We may reason, through the mechanisms of this theory, that hypnosis may be a state of psychoallergy. Those who have carried on series of experiments in this field, observe that a complete state, or trance, can seldom be brought about the first time that hypnosis is tried on the individual. This seems to be the reason why it is easier to effect a state of trance if the subject has undergone

complete hypnosis previously. In other words, rapport has been established. The refractory period has become established, and the stage is set for the performance of the peculiar manifestations of the psychoallergic state.

SUMMARY.

The theory of psychoallergy has been presented to serve as a correlating mechanism for the fields of psychology and biology. The modus operandi of the theory follows the laws of allergy, which, in turn, seem to parallel the various phenomena observed in the field of psychology.

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METABOLISM OF BRAIN, SPINAL CORD AND MENINGEAL TISSUE.*

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Much attention has recently been directed to the study of the metabolism of individual tissues. Let me report to you some of the studies that have been made of brain, spinal cord and meningeal tissue. I shall not consider the large literature relating to peripheral nerve tissue except to mention in passing that the work of Downing, Gerard, Hill, Tashiro, Parker, Fenn and Winterstein indicated that heat, oxygen consumption and carbon dioxide production are concerned with active metabolism of peripheral nerve tissue and that it appeared that carbohydrate oxidation predominantly was concerned with the activity of peripheral nerve. In its resting metabolism, the peripheral nerve very likely utilizes fat because the respiratory quotient is low.

The processes of tissue metabolism are not fundamentally different in peripheral and central nervous tissue, but there are indications of a quantitative difference in the oxidative processes. Until recently very little work was done along these lines because several technical difficulties presented themselves. Hill and Nabarro (1895), Herter (1905), Alexander (1912), Schmidt (1927), Winterstein (1917), Tashiro (1922), Gerard and Meyerhof (1927), Warburg (1924), and Loebel (1925) completed work which showed that brain tissue utilized a considerable amount of oxygen, and that carbohydrate utilization played a very important part in the metabolism of nervous tissues. Later work by Holmes and Holmes (1925) showed that extracts of rabbits' brains contained large quantities of reducing substances (80 to 120 mgms. per cent). They were able to confirm Warburg's observation that there was a large production of lactic acid from added glucose.

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On investigating this problem further it was found that the lactic acid content of the brain increased rapidly under anaerobic conditions, or when brain tissue was removed and kept at the body temperature of the animal. The measurable values for brain lactic acid have been found to vary with the rapidity with which the tissue can be removed and frozen when examined. The brain, with its large blood supply, constantly removes large amounts of blood glucose which is rapidly converted into lactic acid—and probably utilized as such. On the death of the animal and the removal of both oxygen and glucose supply, the few minutes which elapse before the tissue is fixed, are enough to permit the conversion of all, or practically all, available glucose to lactic acid. The brain lactic acid level is dependent upon the blood glucose level.

On the other hand, it is easy to show, in vitro, that lactic acid rapidly disappears from excised brain tissue in the presence of available oxygen. Whether lactic acid is oxidized as such or is converted to some other substance which is then oxidized we do not as yet know.

To quote E. G. Holmes:

> There is abundant evidence that brain tissue can convert glucose to lactic acid, and can in the presence of oxygen remove (or oxidize) lactic acid. However, a large increase of blood glucose—with a consequent large increase in the lactic acid formation—has within wide limits no obvious effect on the function of the nervous system. During anesthesia (with anesthetics that cause hyperglycemia) the lactic acid content of the brain seems, as far as we can judge, still to depend on the blood sugar level, even though the animal may be deeply unconscious. On the other hand, hypoglycemia, caused by insulin, gives rise to convulsions. It is therefore clear that an adequate carbohydrate supply is necessary for the proper functioning of the brain—and it is strange that an insufficient supply of carbohydrate should result not in a stopping of function but in a sudden discharge of nervous impulses—that is a convulsion.

It has been the aim of most workers in this field to determine:

(1) The chemical constituents of brain substance under different conditions; or

(2) The respiratory metabolism of the brain tissue in vivo or in vitro to measure the nature and extent of foodstuff oxidations; or

(3) The ability or limitation of ability of nervous tissue to continue such normal oxidations of foodstuffs under the influence of disease or drugs.

Basic knowledge of brain chemistry is due to the work of Thudichum, von Baeyer, Grignard, Fischer and Willstatter. A recent excellent review of the subject by I. H. Page stresses the rôle of the lipids (*i. e.*, lipoid and fat) in brain chemistry. This field has scarcely been touched upon by efficient chemists and deserves more attention.

I shall attempt to review some of the advances in our knowledge of the respiratory metabolism of brain, spinal cord and meningeal tissue. Most of the advances in this aspect of nervous tissue respiration are due to the work of Ashford, Dickens, Dixon, Gerard, Haldi, Himwich, Holmes, Loebel, Peters, Quastel, Thompson, Wheatley and Wortis.

Experimental approach to these problems has been accomplished mainly by three technical methods:

First—The Barcroft-Warburg method (or one of its recent modifications) wherein small amounts of accurately weighed living tissue are kept under nearly physiological conditions and the gaseous metabolism (*i. e.*, the oxygen consumption and carbon dioxide production) is accurately measured. This method of measuring tissue respiration is, I believe, more accurate for brain tissue than the following " in vivo " method.

Second—The method of simultaneous arterial and venous puncture, with analysis of the blood leaving and entering the organ. The oxygen and carbon dioxide content of the blood is determined by the method of gas analysis described by Van Slyke and Neill. For studies of brain metabolism samples are taken from the internal carotid artery and the deep internal jugular vein.

By both methods one may measure the oxygen utilization and the respiratory quotient (R. Q.) of the tissue. From the known chemical compositions of the basic foodstuffs one can calculate the characteristic respiratory quotient (R. Q.) for carbohydrate or lactic acid to be 1.0; that for protein to be 0.82; and for fat, 0.70.

Third—Furthermore, by placing normal minced brain, spinal cord or meningeal tissue in physiological solutions (Ringer phosphate buffered to pH 7.4 or bicarbonate buffered solutions or blood serum or plasma) containing various foodstuffs, and measuring by exact chemical quantitative methods, the concentration of such foodstuffs in the solution at the beginning and end of an accurately timed experiment—one can determine the ability and

rate of normal brain to utilize such food. In addition, by analyzing (for sugar and lactic acid) samples of blood entering and leaving the brain one can determine the ability of this organ to take from or add to the blood, foodstuffs like sugar or lactic acid.

Each of the methods enumerated has its particular technical advantages and its definite limitations. The work reported in this paper was done by the Barcroft-Warburg manometric technique. Normal brain tissue of the human, monkey, cat, rat and mouse were used. The human material was obtained at the time of a cranial operation. Tissue from the other animals were obtained most often following rapid decapitation without previous anesthesia. Chemical determinations for lactic acid were made by the method of Friedemann, Cotonio and Shaffer, and for sugar, by the method of Hagedorn and Jensen. All the experiments were carried out in Warburg's Ringer phosphate solution buffered to pH 7.4 at 37.5° C.

Respiratory Quotient and Oxygen Consumption of Brain Cortex, Spinal Cord and Meninges.

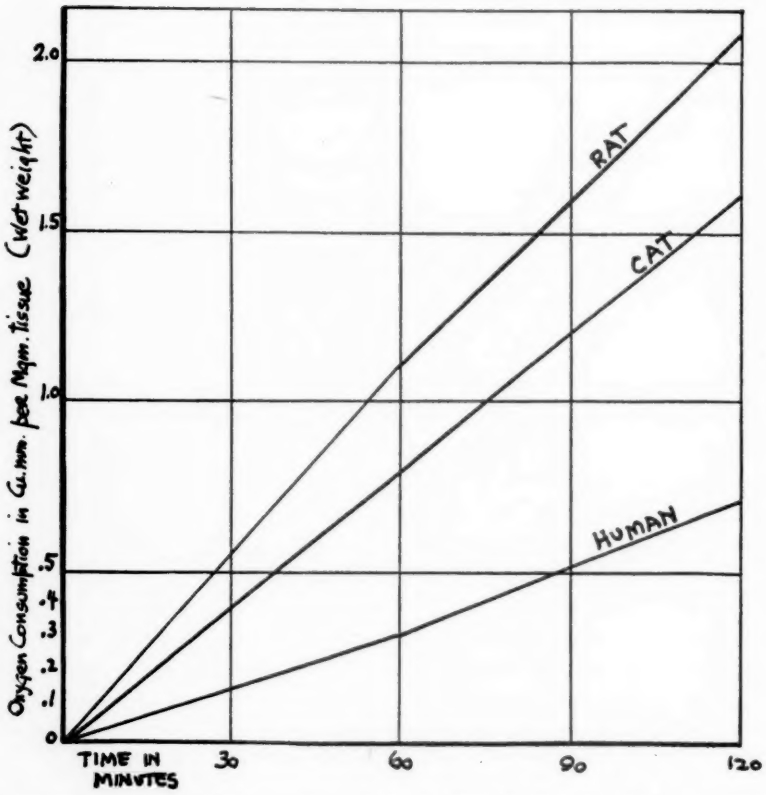
The details of the technique for the measurement of the respiratory quotient of brain and spinal cord tissue have been described in a previous paper.[46] The brain tissue (whether slices or minced tissue) of normal warm blooded animals so far studied (*i. e.*, human, monkey, cat, dog, rat, mouse) yield a respiratory quotient of unity—indicating that brain tissue normally oxidizes carbohydrate or lactic acid. In my experience the difference in oxygen uptake between sliced and minced brain cortex is very little—varying only 5 to 10 per cent at the most. This is in agreement with the experience of E. G. Holmes. Ashford and Holmes say "the total uptake of chopped brain is some 16 per cent less than that of the intact brain, which in our view, does not suggest that the chopping is likely to have had any very serious deleterious effect upon the oxidative mechanisms." Starvation for 14 days in the cat does not affect the respiratory quotient of the excised brain tissue.

A respiratory quotient of 1.0 does not necessarily mean that only glucose is oxidized by the brain—for it is known for example that fructose, glutamic and succinic acids may also be oxidized by excised brain tissue. Richardson has emphasized that oxidation

of combinations of foodstuffs may yield a quotient of unity. However, since other substances exist in the blood in very small concentrations it is more than probable that carbohydrate is the chief fuel of the brain.

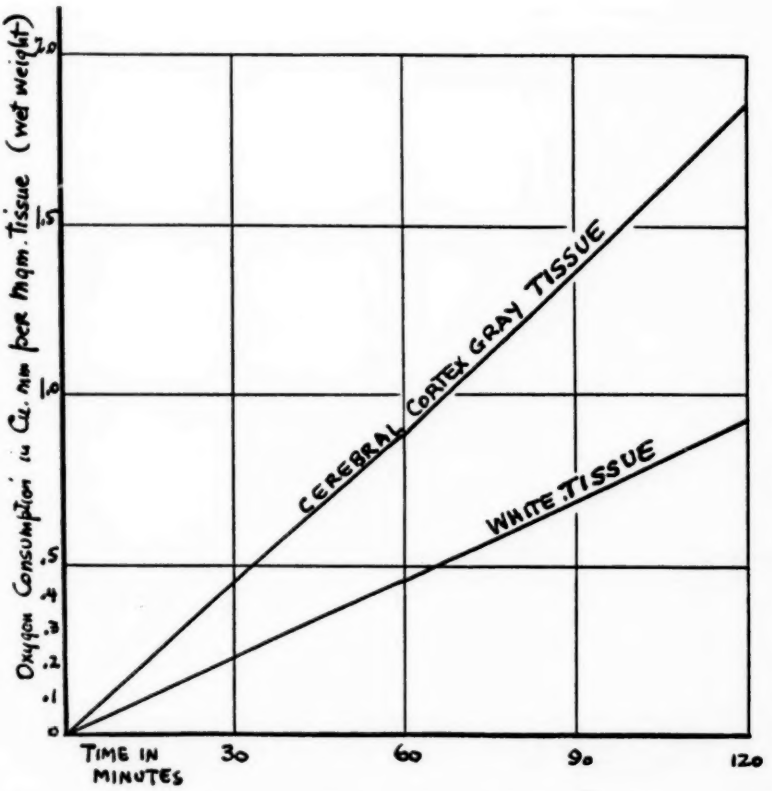
Himwich and Nahum studied the respiratory metabolism of brain tissue in the dog by analysis of arterial and venous blood for carbon dioxide and oxygen by the method of Van Slyke and Neill and found that the R. Q. of brain in the normal unanesthetized, in the phloridzinized and in the depancreatized dogs was unity. Since the respiratory quotient remained unity after pancreatectomy, carbohydrate is not utilized in the form of glucose. They also found that the respiratory quotient was not changed by insulin or pituitrin but was altered by adrenalin and pitressin. These latter effects they attribute to changes or shifts in the water, electrolyte and acid base equilibria. Lennox has measured the R. Q. of human brain and found it to be 0.95; this is in close agreement with Himwich's results when one takes in account the fact that the venous blood obtained for this measurement was taken from the internal jugular vein which contains an admixture of blood from other parts of the head as well as the brain. The oxygen consumption of the dog brain is about 14 cc. of oxygen for 100 grams of brain tissue per minute.[19] This is about 10 per cent of the total oxygen uptake of the animal. Holmes has calculated the oxygen consumption of rabbit brain to be about 20 cc. of oxygen per 100 grams of brain per minute. The oxygen consumption of human brain tissue is less than that of the dog or rabbit. This fact is illustrated in Graph 1 which shows that the brain tissue of smaller animals has a greater oxygen uptake per milligram of tissue per hour than that of larger animals. It can also be demonstrated that in animals of the same species the brain tissue of the younger animal always has a greater oxygen consumption per milligram of tissue (wet weight) than the adult. I have been able to demonstrate this effect in the rat and the cat. (See Graph 3.)

It is also interesting to note in Graph 2 that the oxygen consumption of gray matter is greater than that of white matter. This has also been demonstrated by Eric Holmes who has shown that the distributions of indophenol oxidase and of cytochrome run roughly parallel both to each other and to the rate of oxygen consumption of different types of nervous tissue.



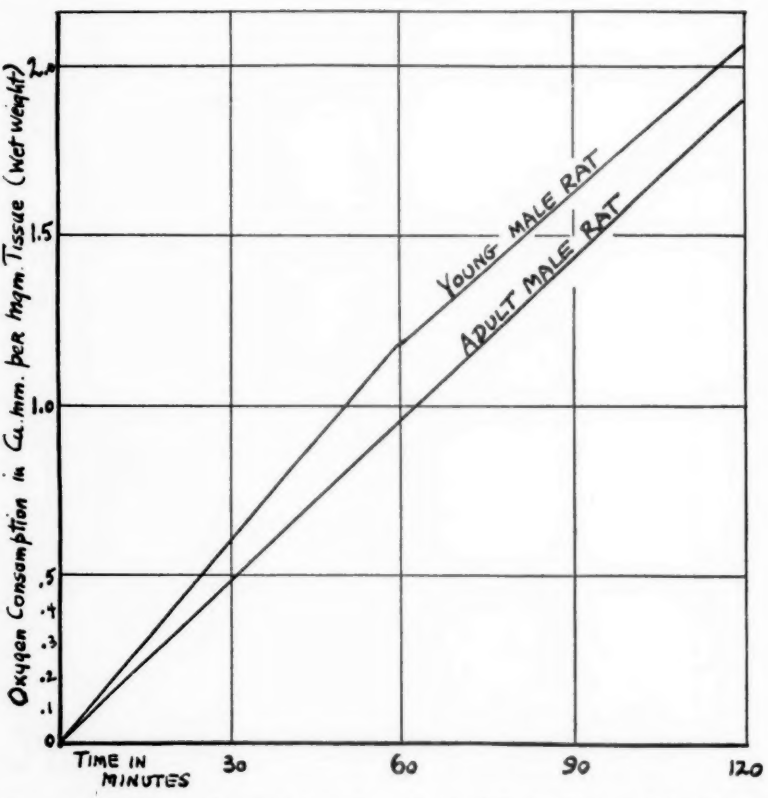
GRAPH 1.—Oxygen Consumption of Excised Brain Tissue of the Human, Cat and Rat.

Tissue in 0.2 per cent dextrose Ringer's phosphate solution (buffered to pH 7.4 at 37.5 C.).



GRAPH 2.—Oxygen Consumption of Excised Brain Tissue. Comparison Between White and Gray Tissue.

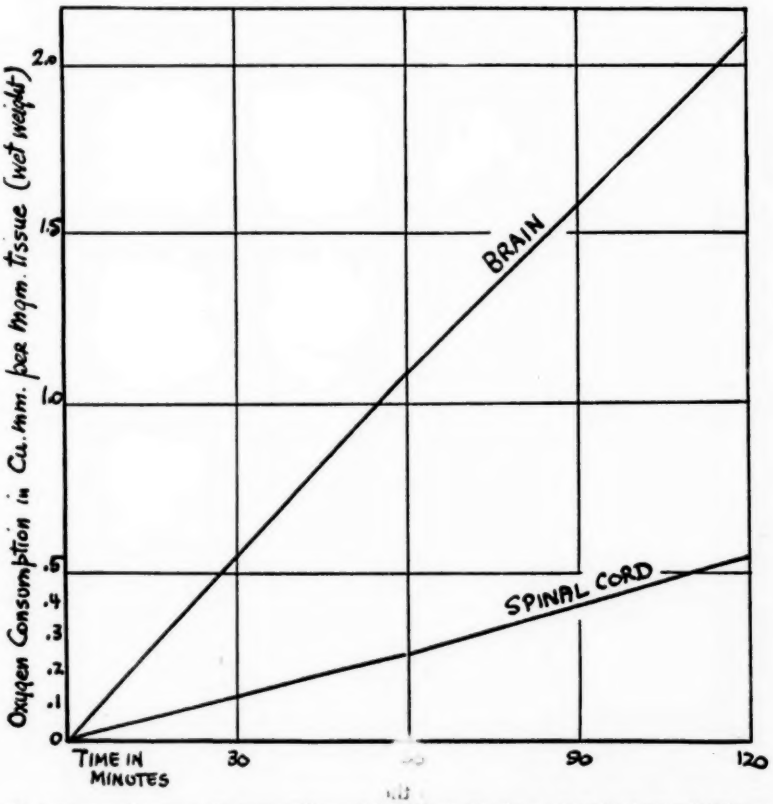
Tissue in 0.2 per cent dextrose Ringer's phosphate solution (buffered to pH 7.4 at 37.5 C.).



GRAPH 3.—Oxygen Consumption of ..e Excised Brain Tissue of the Young and Adult Male Rat.

Tissue in 0.2 per cent dextrose Ringer's phosphate solution (buffered to pH 7.4 at 37.5 C.).

Cerebral and cerebellar cortex of the cat were found to consume practically identical quantities of oxygen per milligram of tissue (wet weight) per unit of time observed. The respiratory quotient of cerebellar cortex was also found to be unity.

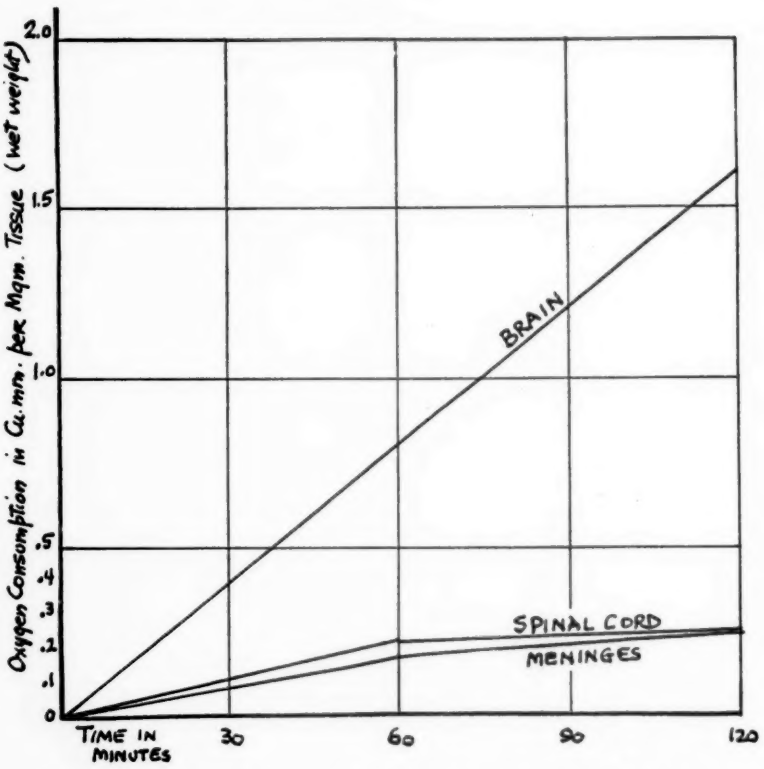


GRAPH 4.—Oxygen Consumption of Excised Brain and Spinal Cord Tissue of the Monkey.

Tissue in 0.2 per cent dextrose Ringer's phosphate solution (buffered to pH 7.4 at 37.5 C.).

The spinal cord of the cat and the normal monkey were studied and it was found that spinal cord tissue per unit weight consumed approximately one-fifth of the amount of oxygen used by brain cortex of the same animal. (Graphs 4 and 5.) The respiratory quotient of this tissue was also found to be unity.

Meningeal tissue taken from a normal cat showed the oxygen consumption of this tissue to be about one-tenth that of the brain tissue taken from the same animal. We have not been fortunate enough to obtain any human meningeal tissue for study. The respiratory quotients of cat meningeal tissue varied between 0.86



GRAPH 5.—Oxygen Consumption of the Excised Tissues of the Cat. Tissue in 0.2 per cent dextrose Ringer's phosphate solution (buffered to pH 7.4 at 37.5 C.).

in plain ringer phosphate to 1.0 in 0.2 per cent dextrose ringer phosphate solution both buffered to pH 7.4.

We have analyzed samples taken almost simultaneously of the blood, brain, spinal cord and meningeal tissue of cats under ether anesthesia. It should be noted that:

(1) The blood sugar level is high—this is due to the anesthetic.

(2) The brain lactic acid is dependent on the blood sugar level.

(3) Meninges seem to have a higher resting sugar content than brain; and this finding taken in conjunction with the absence of lactic acid in the same tissue would seem to indicate that the ability of meninges rapidly to convert sugar to lactic acid is very limited and very unlike brain and spinal cord tissue.

(4) Under anaerobic conditions the lactic acid accumulation in brain tissue is markedly increased.

CONTENT OF SUGAR AND LACTIC ACID IN BLOOD, BRAIN, SPINAL CORD AND MENINGES OF CAT—RESTING VALUES—IN MILLIGRAMS PER CENT AND VALUES OF TISSUE IN NITROGEN FOR 24 HRS. AT 37.5 C.

Experiment.	Sugar.	Lactic acid.
A. Resting Values:		
(1) Brain	237	60
Meninges	340	0
(2) Blood	160	
Brain	98	34.4
Meninges	308	0
(3) Blood	256	24.6
Brain	89	126
Meninges	340	0
(4) Blood	190	23.8
Brain	113.5	84.5
Meninges	211	0
(5) Blood	198	11
Brain	120	119
Meninges	473	0
Cord	145	...

Table of respiratory quotients to show some of the figures obtained for various animal tissues:

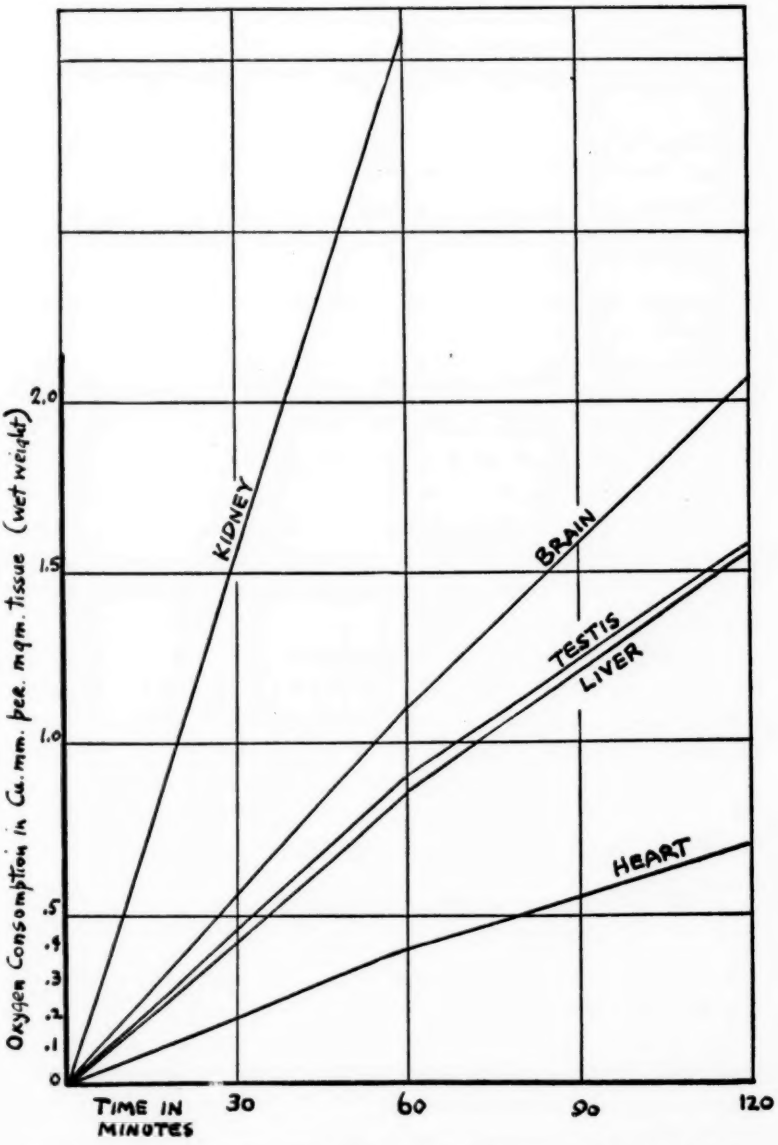
Tissue.	In plain Ringer phosphate solution, pH 7.4.	In 0.2 per cent dextrose Ringer phosphate solution, ph 7.4.
Brain cortex (gray): Human, monkey, cat, dog, rat	1.00	1.00
Cerebellar cortex: Monkey, cat, rat	1.00	1.00
Retina (cat)	1.00	1.00
Spinal cord: Monkey, cat	1.00	1.00
Meninges (cat)	.86 to .93	1.02
Kidney (cat, rat)	.85	.89
Testicle (rat)	.78	.98
Liver (cat, rat)	.75	

The Effects of Foodstuffs on Respiration of Brain and Spinal Cord Tissues.

The addition of dextrose or sodium lactate to the immersion fluid stimulates respiration in surviving excised brain, spinal cord and meningeal tissue. Conversely, the respiration rate of adult brain tissue falls when it is deprived of glucose or lactate. This oxidative stimulation appears to vary directly with the concentration (within physiological limits) of such foodstuffs in the substrate. This effect has been demonstrated by many workers in this field especially Holmes, Dickens and Greville. Holmes showed that the oxygen uptake of gray matter is increased in the presence of glucose; that this is due to the conversion of glucose to lactic acid and if the conversion is prevented by the addition of fluoride, the increase does not occur. Yet the presence of fluoride does not inhibit the greater oxidation due to the addition of lactic acid to the substrate.

Fructose is also oxidized by both brain and retinal tissues. Quastel and Wheatley have shown in studying the succinic acid series that lactate, pyruvate and glycerophosphate are all oxidized. Peters and Sinclair have confirmed this work on pigeon brain. Dickens and Greville have also demonstrated recently that "the respiration of embryonic tissues falls very little when they are deprived of glucose. They appear to contain reserve foodstuffs of whose nature we are ignorant."

McGinty (1929), Himwich and Nahum (1929), and Nahum, Himwich and Koskoff have shown, in extensive animal experimentation, that glucose and lactic acid are absorbed by the brain from the circulating blood in normal, phloridzinized and depancreatized dogs. The brain does not convert or store these foodstuffs as glycogen (Holmes and Ashford, 1930 and Takahashi and Asher, 1925). The evidence at present seems to show that the retained carbohydrate is oxidized by the brain after conversion to lactic acid as demonstrated by Holmes. In depancreatized animals the respiratory quotient of brain remains unity, indicating the utilization of lactic acid in the absence of insulin necessary for glucose oxidation. Lactic acid can be oxidized in the absence of insulin. Very likely the brain of the diabetic animal is able to convert glucose to lactic acid before burning the latter substance. Himwich has emphasized the significance of this capability of brain tissue to use glucose



GRAPH 6.—Oxygen Consumption of Excised Tissues of the Adult Rat. Tissue in 0.2 per cent dextrose Ringer's phosphate solution (buffered to pH 7.4 at 37.5 C.).

and lactic acid as affording it a factor of safety in having two available sources of energy.

That glucose is very rapidly converted to lactic acid is evident from the work of McGinty and Gesell (1925), Kinnersley and Peters (1929), Holmes and Sherif (1932), and Haldi (1932). These workers have shown that the lactic acid content of the normal dog brain is 50 to 70 mgms. per 100 grams of tissue (this is probably too high) and that under anaerobic conditions the lactic acid in brain is increased in 10 minutes to 80 mgms. per 100 grams of tissue. McGinty and Gesell (1925) showed that lactic acid in the brain of a decapitated dog accumulates at the rate of 20 mgms. per cent per minute for the first few minutes. The lactic acid content of mouse brains fixed rapidly in liquid air is invariably low—and the lactic acid formed on anaerobic incubation of this tissue depends on the blood sugar level at death. Furthermore, after giving animals insulin (and producing hypoglycemia) the " resting " brain lactic acid level is decreased.

Ashford and Holmes (1931) were not able to demonstrate any synthesis of carbohydrate in brain tissue by study of the " Meyerhof Quotient."

Ashford (1933) has recently published studies to show that glucose breakdown to lactic acid by brain tissue is not inhibited by the presence of glycogen and he offers evidence to show that brain tissue contains two mechanisms for the production of lactic acid. This problem requires much more investigation. It is possible that carbohydrate in either brain cerebroside or nucleoprotein may be utilized by brain tissue.

The Effects of Some Drugs, Sedatives, Amines and Vitamins on Brain Tissue Respiration.

I want to review briefly the effects of some drugs on brain respiratory metabolism.

(1) Monoiodacetic acid prevents the conversion of glucose to lactic acid in brain tissue and kidney tissue as demonstrated by Haldi (1932) and Holmes (1933).

(2) Adrenalin and pitressin cause variations in the respiratory quotient of the brain—not necessarily through any particular alteration in the character of the foodstuffs oxidized but by alterations in the acid-base, water and electrolyte balance. (Tolstoi, Loebel,

Levin, and Richardson (1924); Nahum and Himwich (1931); Haldi, Larkin and Wright (1926); Underhill and Pack (1923); Buschke (1928). Himwich, Fazikas, Barker and Hurlburt (1934) have recently shown that brain tissue excised from adrenalectomized rats showed a depressed oxygen consumption and respiratory quotient. In the presence of glucose, the oxygen uptake of cerebral cortex of rats with acute symptoms of adrenal deficiency did not rise to the level of that of the normal controls using the same substrate.

(3) Alcohol can apparently be partly oxidized by brain tissue. (Himwich *et al.*, J. A. M. A., 100, 651, 1933.)

(4) Methylene blue causes a diminution in the oxygen uptake of brain tissue. The carbon dioxide production decreased to a greater extent than the oxygen utilization—therefore producing a fall in the respiratory quotient when brain tissue metabolism is measured in the presence of methylene blue. (Himwich, Fazikas and Hurlburt, 1933.) Jares has noted that there is a rough inverse relationship between the degree of aerobic glycolysis and the effect of methylene blue on the respiratory quotient.

(5) Thyroxine—McEachern has reported that tissues isolated from hyperthyroid animals maintained an increased oxygen consumption but somewhat less than would be expected from the increase in the total oxygen consumption of the animal. However, his reports are concerned with muscle, hepatic and renal tissue and do not mention the effect on brain tissue. This problem requires further investigation.

(6) Dinitrophenol—Krahl and Clowed investigated the effect of dinitrophenol on cellular oxidative mechanisms and concluded that from the available evidence the effect of dinitrophenol was accomplished by means of accelerating the oxidation by cytochrome of some substrate previously or simultaneously acted upon by the anaerobic dehydrases of the cell.

(7) Phenylhydrazine—Dickens has shown that treatment of brain tissue with phenylhydrazine raises its power of aerobic glycolysis and depresses its oxygen consumption in the presence of glucose or lactate. This effect is in contrast with the effect of potassium observed by Ashford and Dixon.

(8) Narcotics—Quastel and Wheatley have demonstrated that "narcotics in general inhibit the oxidation by brain of glucose, sodium lactate and sodium pyruvate, but do not inhibit the oxidation

of sodium succinate and p-phenylenediamine." They also believe that of " narcotics belonging to the same chemical type, those with the greater hypnotic activity have the greater inhibitive action on brain oxidations." In a later paper these workers have produced evidence to show that this inhibition of the oxygen consumption of brain tissue in the presence of glucose, which is brought about by narcotics is very nearly completely reversible if the tissue is washed in glucose-phosphate Ringer solution after having been shaken in a manometer for one-half to two hours in the presence of the narcotic. The inhibition of hyoscine, mescaline and B-phenylethyline is also reversible while that brought about by indole is not.

G. A. Emerson studied the effects of various anesthesias on the autoxidation rate of surviving brain tissue and found decreased autoxidative rates in brains of rats anesthetized with glycogenolytic narcotics. Some few anesthetics produced no decrease in brain respiration.

However, it can be shown that most narcotics have one common property—that of inhibiting at low concentrations the oxidation of substances essential in the metabolism of carbohydrates such as glucose, lactic acid and pyruvic acid. There is much evidence to show that different hypnotics are differently or specifically adsorbed and act on different parts of the brain.

In some work previously published I have shown that cocaine and sodium cyanide depress the respiratory quotient and oxygen uptake of brain tissue. Moreover, sodium bromide, although it does not affect the respiratory quotient of brain tissue appears to depress the ability of brain tissue to oxidize foodstuffs as rapidly as under normal conditions. This effect is illustrated in the figures that follow, taken from an experiment.

	Ringer phosphate with 0.2 per cent dextrose.	R. P. with 0.2 per cent dextrose plus 0.5 per cent sodium bromide.	Plain Ringer phosphate.	R. P. plain plus 0.5 per cent sodium bromide.
Initial lactic acid content mgms./100 gms.	118.0	80.5	87.5	49.0
Final lactic acid content—mgms./100gms. (after a 2 hr. experiment)	71.0	60.5	66.0	43.5
Difference mgms. lactic acid/100 gms.	47.0	20.0	21.5	5.5

Dameshek, Myerson and Loman have shown in the human that under the effect of large doses of sodium amytal there is a slight but definite diminution in uptake of oxygen and dextrose by the brain.

(9) Insulin diminishes the oxygen uptake of brain tissue. This has been demonstrated by Holmes and confirmed by Wortis. The cellular anoxemic effect may account for the convulsive phenomena. However why diminished oxidations of brain tissue should produce a discharge of neural impulses, rather than a suppression of activity, requires further investigation.

(10) Amines—Quastel and Wheatley have studied the effects of a number of amines on the oxidations of brain tissue. They found that B-phenylethylamine, B-phenyl-B-hydroxyethylamine, tyramine, indole, isoamyline, and mescaline inhibit strongly the oxidation of glucose, sodium lactate and sodium pyruvate by the brain. Furthermore, neurine, cadaverine, putrescine, ethylamine and histamine have relatively little effect on the oxidation by brain of glucose, sodium lactate and sodium succinate. These findings require confirmation and their relationship to mental disorder should be investigated.

(11) Vitamins A, B, C and carotene are found in brain.[49] Both vitamins A and B are known to be associated with changes in brain function. In children with vitamin A deficiency John and Block have found apathy and numbing of mental processes. However nothing is known of the exact rôle vitamin A plays in brain metabolism.

Vitamin B deficiency is more usually recognized as having associated mental and neural changes. It was recently shown by Peters, Sinclair and Thompson that there is defective brain tissue oxidation, especially of lactic acid, in avitaminotic (polyneuritic) animals. Furthermore, the addition of vitamin B_1 to such brain tissue causes increase in the tissue respiration, up to normal values. Himwich has confirmed this work and in addition demonstrated the effect on the respiratory quotient which is repaired when vitamin B_1 is supplied to the tissue.

Brain tissue is particularly rich in vitamin C (ascorbic acid). According to the work of Malmberg and von Euler, and Plaut and Bulow, this ascorbic acid occurs in the brain mostly in its reduced form. It is present in greater amount in the brain of young than

in that of adult animals and the quantity diminishes during experimental scurvy (in guinea pigs). The nervous system has been shown to be involved in scurvy by Stewart who reported neuro-psychiatric symptoms in 150 cases of scurvy observed during the World War.

I have attempted to bring to your notice some few fragments of our present knowledge of the metabolism of brain tissue. There is much more evidence that I have not touched upon which concerns itself with the chemistry of brain tissue. Much work has been done and is at present being done to give us a better knowledge of the chemistry of this organ. Knowledge of the metabolism of brain tissue is only in its infancy and is worthy of more attention.

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THE PSYCHONEUROSES AND NEUROSES.

A Review of 100 Cases with Special Reference to Treatment and End Results.*

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Treatment in any branch of medicine requires on the one hand a knowledge of the etiology, the pathological anatomy and the physiology of the disease process, and on the other the method of recovery and the mode of operation of the therapeutic agents employed. This scientific approach to the problem of treatment when applied in the management of the psychoneuroses and neuroses meets with a great many serious obstacles. *At present* we have no primary morbid anatomy or physiology for these diseases. We have a psychopathology which when subjected to scientific criteria of proof is not completely convincing even to the most sympathetic observers who have the objective method of thinking. Our knowledge of the etiology is at best meager as evidenced by the many and varied factors enumerated by different observers as causes of the minor psychoses. The lack of definite knowledge regarding the etiology and the mode of symptom formation precludes the possibility of scientific treatment and leads to a considerable diversity of opinion regarding both diagnosis and therapy. The causes of our ignorance regarding these fundamentals are evident.

Psychoneuroses and neuroses are undoubtedly very complex and are somehow related to the deeper strata of our psychobiological existence. Until a few decades ago the investigations of these problems were relegated to non-scientists. Perhaps the most important cause of the unsatisfactory progress is to be found in the *subjective* aspect which is unavoidable both on the part of the patient and on the part of the investigator and therapeutist.

* Presidential address, Philadelphia Psychiatric Society, January 10, 1936. From the Department of Neurology, Graduate School of Medicine and from the Department of Psychiatry, School of Medicine, University of Pennsylvania.

In the final analysis it is this subjectivity that leads to the failure of universally accepted concepts regarding the disease process and to a lack of standard procedures of treatments observed in other branches of medicine. There is of course some general agreement regarding gross classification and treatment. However, in no other branch of medicine does failure or success depend so much upon the individual therapeutist, as it does in the management of the psychoneuroses and neuroses. Objective as he may attempt to be, the therapeutist develops, in the course of years, definite individual concepts regarding symptom formation and treatment procedures which, unlike surgical procedures, for instance, are more or less peculiar to himself. This is obviously not strictly scientific. But the practice of medicine is not primarily a scientific experiment. Its aim after all is the prevention and cure of disease by any available recognized method.

With the above in mind 100 cases of psychoneuroses and neuroses were studied carefully to ascertain the methods employed in treatment, the end results which were achieved, and to determine whether any modifications were possible to improve the treatment. Before proceeding to the analysis of the material certain preliminary remarks are necessary.

There is a general agreement that for therapeutic purposes the diagnosis of psychoneuroses and neuroses implies the absence of any *primary* organic structural or chemical disease, the existence in the majority of cases of a certain constitutional make-up (the predisposing causes), the occurrence of precipitating or exciting causes, and the formation of symptoms which may be in the psychic or in the physiological spheres or in both. The constitutional factors may be inherited or acquired, frequently as an integral part of the psychosexual development of the individual. The term " psychopathic personality " is intended to describe in this presentation a type of make-up characterized either by marked swings of mood or by seclusiveness, misinterpretiveness and other schizoid trends. In the " neurotic " personality the neurosis is " built into the character " and is characterized by manifestations intermediate between normal character traits and neurotic symptoms (Jones [1]). Symptom formation results from the action of some exciting cause which may be an injury, infection, a chemical disturbance or some emotional stress. The symptoms may continue long after

the exciting cause ceases to operate, and represent release phenomena of the neurotic traits of the previously apparently well integrated personality. These symptoms include either frank anxiety states or symptoms tending to avoid anxiety such as conversion, compulsive-obsessive and neurasthenic syndromes, etc. These symptoms may vary in severity from a slight headache, increased fatigability and irritability to devastating visceral disturbances, intractable insomnia with marked agitation and alarming loss of weight. The clinical manifestations frequently overshadow completely the primary constitutional factors or the immediate precipitating mechanisms.

There is still a considerable difference of opinion regarding the therapeutic approach. There are few neuropsychiatrists who believe that the removal of foci of infection and the like will cure a psychoneurosis. Many concentrate their attention on the correction of the visceral and metabolic disturbances and combine this with various psychotherapeutic procedures intended to allay the emotional tension. There are those who are ambitious enough to treat only the fundamental psychogenic causes and limit their treatment to a special psychotherapy which, in their opinion, precludes the use of sedative drugs, suggestion, strict regimen and other palliative measures. Lastly, some workers regard psychotherapy as something vastly different; and in the treatment of every case utilize all measures which will bring the patient comfort, and at the same time, attempt the correction of the underlying psychogenic causes and symptoms. The author has for a number of years attempted to practice this last form of psychotherapy.

As was stated at the outset, psychotherapy does not exist as yet as a definite science. In a general way the term psychotherapy means the application of psychological science to the treatment of disease. It is obviously not a treatment of the mind but a treatment by the mind. In reality a satisfactory definition of the term psychotherapy is difficult to present. Janet's [2] definition is probably the best:

> Psychotherapy is a totality of therapeutic procedures of all kinds, both physical and moral, applicable alike to bodily and to mental disorders, procedures determined by the consideration of psychological phenomena which have previously been studied, and above all by the consideration of the laws

which regulate the development of these psychological phenomena and their associations, either with one another, or with physiological phenomena.

Janet however admits that since we lack precise methods and definite knowledge regarding the indications for and the results of these methods, we must use every available empiric method to aid our patients. The author is in accord with this opinion.

In actual practice our ideal is an attempt to remove the fundamental causes and accomplish a permanent cure. In the majority of cases, however, the best accomplishment is procuring a symptomatic recovery or even only some improvement.

In practice there are two indications in treatment: The removal of the cause and the amelioration of symptoms. Except in cases of anxiety neurosis and some cases of conversion hysteria, the causes are deep seated and they require at least a *partial analysis* for their removal. This consists at the beginning of making a formal neuropsychiatric study. Then an attempt is cautiously made to establish a satisfactory rapport with the patient and guide him to retrace the early development in all of its phases. After a few interviews, if circumstances permit, the free association method becomes indispensable in order to reveal the psychosexual development of the patient. When possible a complete analysis should be carried out in suitable cases. For the majority of private patients, the following measures are practiced. Some of the latter undoubtedly influence the personality to some degree but the majority affect only the symptoms. Among these measures are (I) purely psychological; (II) others partly psychological and partly physiological, while still others (III) are purely physiological in the effects. Group I includes: Encouragement, suggestion, rationalization and persuasion, attempts at compromise formation, education and re-education, partial analysis and psychoanalysis. Group II consists of: Regimen at home and at work, and a change of environment, hospitalization for rest cures, etc., occupational therapy and physiotherapy. Group III includes: Sedative, somnifacient, tonic and endocrine drugs and attention to nutritional and hygienic needs.

Analysis of the Material.

The 100 patients analysed include private cases only. They were under observation between the years of 1925 and 1935 and

most of them were treated within the last seven years. No cases are included unless they were followed for a sufficient length of time to permit some conclusion regarding the end results of the treatment. The length of treatment varied from a period of 2 weeks to 4½ years. Some cases were checked by follow-up inquiries. All traumatic-litigation cases have been excluded.

The 100 cases were divided into five groups and their relative frequency is indicated in Table I. As is well known some of the diagnoses are not clear cut as more than one condition may exist in the same patient. The cases are listed according to their predominant clinical manifestations. No well studied cases of hypochondria of psychoneurotic origin were found in this series.

TABLE I.

INCIDENCE OF CLINICAL TYPES.

	No. of cases.		
	Male.	Female.	Total.
Anxiety neuroses	4	5	9
Conversion hysteria	5	7	12
Anxiety hysteria	15	48	63
Compulsive-obsessive reactions	6	7	13
Neurasthenia	2	1	3
	32	68	100

In this presentation, due to limitation of space, the symptoms of the various groups are not tabulated. However, the definitions of the several groups as given indicate the chief manifestations. Inasmuch as treatment depends upon the etiology, it was deemed necessary in presenting this to list the family history, the personality and the precipitating causes. Herewith follows a consideration of the five groups.

Anxiety Neuroses.—Under this heading are included those neuroses characterized by *episodic* occurrence of anxiety accompanied by definite somatic symptoms, and by complete or nearly complete freedom from all symptoms between attacks. There were nine cases of anxiety neuroses in this series and the analysis is tabulated in Table II. As in other types of neuroses, the personality make-up in anxiety neurosis is not of particularly great

significance. The precipitating causes are to be found in the immediate present or in the recent past and as observed in this series they were not particularly complicated. The treatment in this group of cases is relatively simple if the causes can be removed.

TABLE II.

ANXIETY NEUROSES.

	No. of cases.
Family history:	
Neuropathic	3
Psychopathic	1
Negative	5
Total	9
Personality:	
Neurotic	5
Psychopathic	0
Average normal	4
Total	9
Precipitating causes:	
Fears related to masturbation	3
Coitus interruptus and other unsatisfactory methods of contraception	4
Fear of homosexuality	1
Fear of approaching marriage	1
Financial reverses	2
Illness and death in family and of close friends	2
Modes of treatment:	
Appropriate contraception	6
Rationalization	3
Encouragement	4
Suggestion	4
Sedative medication	5
End results:	
Recovery	9
Recurrence	1

Inasmuch as most of the latter are to be found in the irregularities of the sexual act, the treatment consists largely in the removal of the cause, in suggestion, in encouragement and other superficial modes of psychotherapy and in sedative medication. The results in the majority of cases of anxiety neurosis are favorable and all cases in this series recovered, there being only one recurrence.

Conversion Hysteria.—Under this term are designated forms of psychoneuroses characterized by the presence of motor, sensory, visceral and episodic phenomena (conversion symptoms) accom-

TABLE III.

CONVERSION HYSTERIA.

	No. of cases.
Family history:	
Neuropathic	6
Psychopathic	1
Negative	5
Total	12
Personality:	
Neurotic	8
Psychopathic	0
Average normal	4
Total	12
Precipitating causes:	
Death and illness in family	2
Marital infelicity	3
Infidelity to spouse	2
Financial reverses and economic insecurity	5
Excessive obesity	1
Modes of treatment:	
Encouragement	4
Suggestion	9
Rationalization and persuasion	2
Attempt at compromise formation	3
Partial analysis	4
Regimen	2
Tonic medication	3
End results:	
Recovery	9
Improvement	3
Recurrence	2

panied by little or no anxiety, not due to any physical or biochemical causes and traceable to some definite psychogenic cause. Cases associated with trauma-litigation, of which there were many, were excluded from this analysis. The findings in the 12 cases of this series are analyzed in Table III. In conversion hysteria the family

history and the personality of the patient play a considerable rôle. The precipitating causes in this group of cases are usually not difficult to find, and in this series were related chiefly to marital difficulties, death in the family, and to a feeling of economic insecurity. Suggestion in some form is probably the first method of treatment employed for these cases. Marital and economic difficulties require also considerable effort in attempts at compromise formations. The end result in these cases is usually good providing the cause can be removed or the patient is made to make some compromise. In this series nine cases recovered, three improved and only two recurred.

Anxiety Hysteria.—Under this term are designated conditions showing a variety of somatic complaints not due to primary organic or biochemical disturbances, accompanied by diffuse anxiety or by phobic phenomena, and traceable to psychogenic, often unconscious. causes. This group makes up 63 per cent of the series and findings are analyzed in Table IV. In this group of cases the family history

TABLE IV.

ANXIETY HYSTERIA.

	No. of cases.
Family history:	
Neuropathic	29
Psychopathic	12
Negative	22
Total	63
Personality:	
Neurotic	48
Psychopathic	2
Average normal	13
Total	63
Precipitating causes:	
Illness in family	7
Death in family	5
Marital infelicity	10
Dissension in family	3
Abnormal attachment to other members of family	5
Sexual indiscretions	2
Surgical menopause	2
Fear of criminal punishment to self or some member of family	4

TABLE IV.—CONTINUED.

Precipitating causes:—*Continued*	No. of cases.
Financial reverses and economic insecurity	6
"Old maidedness"	5
Fear of marriage and pregnancy	4
Frigidity	8
Impotence in husband	3
Homosexuality	6
Ordinary strain of life	6
No satisfactory cause	3
Modes of treatment:	
Encouragement	30
Suggestion	48
Rationalization and persuasion	10
Attempts at compromise formation	25
Education and reeducation	12
Partial analysis	15
Regimen at home, at work and change of environment other than hospitalization	11
Hospitalization	11
Occupational therapy	7
Physiotherapy	6
Sedative and tonic medicinal agents	43
End results:	
Recovery	21
Improvement	30
No improvement	6
Developed psychoses	6
Recurrence	18

indicates a large proportion of neuropathic and psychopathic ancestry. The personality history indicates a large neuropathic element. The predisposing causes in this group of cases are usually deep-seated while the precipitating factors are numerous and varied. Even without a deep analysis and only by the review of the precipitating factors, it may be observed that these patients have a great deal of distortion in their psychosexual development and attitude. As is well known the clinical course of these cases is extremely troublesome to the patient, the family and to the physician. In addition to numerous somatic complaints the presence of diffuse anxiety and numerous phobic phenomena make the management of these cases trying and require a great deal of ingenuity on the part of the physicians and their aides. Eleven of

this series required hospitalization because of the inability to manage them at home. In another 11 cases a great deal of attention had to be paid to the regimen and the daily activities of the patients which were outlined to them. Encouragement, suggestion and hospitalization were used in a good many of the cases but these in themselves have but limited value. An element which is of some importance in the treatment of these cases is an attempt at compromise formation. Especially is this true in marital difficulties where the illness of the patient is probably the most important element in the marital infelicity. Sedative and tonic medication was indispensable in a great majority of cases. Perhaps the single most important agent is the partial analysis but because of the elements of time-consumption and expense and because of the resistance of a good many patients this is not always practical. My impression is that of all the cases those in whom a partial analysis was performed were most benefited. At the same time attention is directed to the fact that even in these 15 cases where partial analysis was employed other forms of treatment, especially sedative and tonic medication, were employed.

In this series of 63 cases 21 of the latter recovered, 30 cases improved and 6 cases showed no improvement. Eighteen cases of the series had recurrences. Thirteen of the 21 recovered cases received a partial analysis. It is of interest to note that among the recurrences not one received partial analysis. Six cases developed a psychosis which should make the diagnosis of anxiety hysteria guarded. Five of these six cases developed an agitated depression while one turned out to be a definite schizophrenic.

Compulsive Obsessive Reactions. (Psychasthenia of Janet.)—Under this term are designated conditions characterized by the existence of irrepressible thoughts and irresistible impulses designed to avoid anxiety, by the patient's recognition of the absurdity of these thoughts and impulses, and by the appearance of anxiety when the patient attempts to " disobey " the thoughts and impulses. The findings of the 13 cases in this series is summarized in Table V. In this group the family history is not predominantly significant. The personality history on the other hand shows a very definite neuropathic trend. This becomes more evident when even a partial analysis is attempted. By this method neurotic traits are found to have existed since childhood, but were thoroughly integrated in the

TABLE V.

Compulsive-Obsessive Reactions.

	No. of cases.
Family history:	
Neuropathic	3
Psychopathic	2
Negative	8
Total	13
Personality:	
Neurotic	11
Psychopathic	0
Average normal	2
Total	13
Precipitating causes:	
Anal eroticism	5
Latent pronounced homosexuality	3
Sodomy	2
Frigidity	3
Incest with sister	2
Abnormal attachment to siblings	2
Abnormal attachment to children	3
Suicide in parent	1
Economic insecurity	2
Menopause	1
Modes of treatment:	
Encouragement	2
Suggestion	5
Rationalization	2
Attempt at compromise formation	2
Education and reeducation	2
Amytal narcosis with partial analysis	2
Partial analysis	11
Sedative medication	6
End results:	
Recovery	2
Improvement	8
No improvement	3
Recurrence	3

personality make-up and did not produce disabling symptoms until somewhat later in life. The precipitating causes can only be ascertained by a partial analysis and then are to be found largely in the psychosexual sphere. It is in this form of psychoneurosis that treatment other than a partial analysis is of little value. Yet these patients have periods of anxiety when the ordinary forms of treatment including encouragement, suggestion and sedative medication are of definite value. For the majority, however, some attempt must be made to make them re-live their early experiences. This is a long drawn out affair because of the inherent resistance of these patients to the necessary investigation and because of their critical attitude to any form of treatment. Of the 13 cases in this series all received a partial analysis, two with the aid of amytal narcosis (Yaskin [8]). Only two of these cases can be regarded as having recovered. Eight improved but many of their difficulties lingered with them. Three showed no improvement and of the eight that improved three had recurrences.

Neurasthenia.—By this is understood a relatively rare disease beginning in early life, lasting with intermissions throughout life, and characterized by abnormal mental and physical fatigability and irritability, various somatic complaints, mental depression and insomnia, etc. Neurasthenia as a primary disease is to be distinguished from the neurasthenic symptom complex which is of common occurrence in many and varied somatic, endocrine and metabolic diseases and in the neuroses, psychoneuroses and psychoses. In this series there were only three cases, all with a neuropathic family history and all showing temporary improvement with suitable rest regimens and living within the bounds of their physical and mental capacities.

General Comment.

Family History and Personality.—An analysis of the family history and personality study as shown in Table VI reveals no unusual factors. The high incidence of neuropathic inheritance is in keeping with the civilian types of psychoneuroses. The incidence of the neurotic types of personality in this series is higher than is generally supposed. An important reason for this is probably the fact that 32 of the 100 cases received a partial analysis thus

making it possible to disclose the existence of neurotic traits prior to the development of the clinical manifestations.

Precipitating Causes.—A review of the precipitating causes as shown in Table VII is of some interest. In keeping with the general knowledge on this subject, there are *no specific* etiological factors. The causative factors embrace a wide range of economic, social, marital and psychosexual components. In anxiety neurosis and conversion hysteria the causes are relatively superficial while in anxiety hysteria and compulsive-obsessive reactions they are more profound and are more intimately associated with the psychosexual

TABLE VI.

FAMILY HISTORY AND PERSONALITY IN THIS SERIES OF 100 CASES.

	No. of cases.
Family history:	
Neuropathic	44
Psychopathic	16
Negative	40
Total	100
Personality:	
Neurotic	75
Psychopathic	2
Average normal	23
Total	100

life. The latter observation is, however, definitely influenced by the fact that of the 63 anxiety hysteria cases 15 of this number and all of the 13 cases of compulsive obsessive reactions received partial analysis while of all the remaining cases in the series of 100 only 4 were partially analyzed.

In the majority of cases in this series there is more than one precipitating cause; and it is probably true that the clinical manifestations result from cumulative action of various factors. It is frequently impossible to evaluate the importance of several existing causes. This is true even when a careful personality study is combined with an accurate chronological development of the various precipitating factors.

At times it is difficult to state whether the "precipitating cause" is really a cause or an evidence of disease. This is particularly true of marital infelicities which are not infrequently determined by the subtle neurotic attitudes of the patient. If this be so, it is

TABLE VII.

THE PRECIPITATING CAUSES IN THIS SERIES OF 100 CASES.

	Anxiety neurosis.	Conversion hysteria.	Anxiety hysteria.	Compulsive obsessive reactions.	Occurrence in No. of cases.
Finances, reverses and economic insecurity	2	5	6	2	15
Illness and death in immediate family and of close friends	2	2	12	1	17
Marital infelicity including infidelity	..	5	12	..	17
Other dissensions in family	..	3	..	..	3
Fear of criminal punishment and social ostracism to self or to members of family	..	..	4	..	4
Surgical menopause and other endocrine disturbances	..	1	2	1	4
"Old maidedness"	..	..	5	..	5
Abnormal attachment to certain members of family	..	..	5	5	10
Coitus interruptus and other unsatisfactory methods of contraception	4	..	..	..	4
Fears related to masturbation	3	..	..	..	3
Fears of marriage and pregnancy	1	..	4	..	5
Frigidity	..	..	8	3	11
Impotence	..	..	3	..	3
Incest with sisters	..	..	..	2	2
Homosexual trends	1	..	6	3	10
Anal eroticism	..	..	..	5	5
Sodomy	..	..	..	2	2
Ordinary strain of life and no satisfactory causes	..	..	9	..	9

of considerable therapeutic importance, especially as it points to the necessity of attempting compromise formations. In a large proportion of the 17 cases of marital infelicity in this series the neuroticism of the patient was the determining cause of the marital discord.

It would appear from this review, that, contrary to psychoanalytical trends, ego and herd instinct motivations as observed in economic insecurity, fears of criminal punishment and of social ostracism, "old maidedness" and similar related factors play an important rôle as precipitating causes in the psychoneuroses. On the other hand there is a large proportion of patients in whom the disturbance of the love life undoubtedly acted as a determining cause. The shades of the disturbance varied from infidelity of a spouse to sister-incest. It is particularly significant that frigidity

TABLE VIII.

MODES OF TREATMENT IN THIS SERIES OF 100 CASES.

	Anxiety neurosis.	Conversion hysteria.	Anxiety hysteria.	Compulsive obsessive reactions.	Total No. of cases.
Encouragement	4	4	30	2	40
Suggestion	4	9	48	5	66
Rationalization and persuasion	3	2	10	2	17
Attempts at compromise formation	..	3	25	2	30
Education and reeducation	..	..	12	2	14
Partial analysis	..	4	15	11	30
Partial analysis with amytal narcosis	..	..	..	2	2
Regimen at home, at work and change of environment other than hospitalization	..	2	11	..	13
Hospitalization	..	..	11	..	11
Occupational therapy	..	..	7	..	7
Physiotherapy	..	..	6	..	6
Sedative and tonic medication	5	3	43	6	57
Appropriate contraception	6	..	..	..	6

was encountered in 11 cases and homosexual trends in 10 cases, and these occurred almost exclusively among the cases found in the anxiety hysteria and compulsive-obsessive reaction groups.

Modes of Treatment.—In reviewing the modes of treatment employed as shown in Table VIII it is difficult to draw many definite conclusions although there are many facts therein which are of interest. The methods employed are clinical applications and are not to be regarded necessarily as scientifically controlled procedures. They are therefore not entitled to scientific credit nor to scientific criticism. As empiric measures, their value should be judged entirely by their therapeutic success or by their failure.

A mere glance at Table VIII discloses that a great many methods were used in the same patient and one unpleasantly associates this with the old "polymorphous pharmacy." Like the latter, however, these methods have, for the present, some definite though empiric value.

Irrespective of the fundamental psychopathology, the relief of symptoms is always of importance. Some methods such as encouragement and suggestion are, like the stomachics and hematonics of old, of distinct benefit for the majority of cases. Encouragement was employed in 40 and suggestion in 66 of the 100 cases. These methods are intended for the removal or correction of symptoms and are particularly valuable in conversion hysteria and in most cases of anxiety hysteria. They are of limited value in some cases of anxiety hysteria and only rarely of real benefit in compulsive-obsessive reactions. Of the other methods intended for the amelioration of symptoms, regimen and hospitalization were used in 24 cases, most of the latter found in the group of anxiety hysterias. In some cases these methods were indispensable and in the majority of others of definite benefit. Along with these procedures occupational and physical therapy proved useful. Somnifacients and sedatives were employed without hesitancy when anxiety was a prominent or acute symptom in any of the cases of this series. In the ill nourished, tonics were used freely.

The remaining methods which were employed attempt to influence the underlying causes and psychopathological processes. Mention should be made that most of these methods are tinted with elements of suggestion and encouragement which need not detract from their therapeutic value.

Appropriate contraception is frequently a relatively simple and beneficial procedure, especially in anxiety neurosis.

Rationalization and persuasion, education and re-education, all of which attempt to utilize the intellectual approach, are probably of limited value as observed in most cases in which they were used. They were employed chiefly in anxiety hysteria and perhaps were useful in preparing the patient for a partial analysis. Rationalization and persuasion are of some benefit in anxiety neurosis resulting from the fear of the consequences of masturbation.

Attempts at compromise formation is of definite benefit in suitable cases. In this procedure the patient is carefully guided to

evaluate the various situations which may have a bearing on his illness. By comparing different possible solutions with their possible consequences the patient makes a choice in accordance with the changed emotional attitude. This process is tedious but is of considerable benefit to the patient. Attempts at compromise formation have proved of definite value in some cases of marital infelicity, in situations associated with a feeling of economic insecurity, "old maidedness," fear of ostracism and in related conditions. The great majority of cases treated by this method were anxiety hysteria.

Partial analysis is in the author's experience the best psychotherapeutic approach to the underlying psychopathology and etiological factors. By this method a limited exploration of the unconscious is attempted first through formal interviews, then, after some explanation to the patient of what is sought, by a modified free association technique. This method is not to be compared with a full psychoanalysis. It is not a complete investigation of the unconscious but surprisingly it is often deep enough to touch upon fundamental processes and achieve considerable benefit. It has the great advantage in that it is not so time consuming. It proved of definite benefit in most of the cases of conversion hysteria, anxiety hysteria and compulsive-obsessive reactions. In the last named group it is the only method (except psychoanalysis) that is worth attempting. In two cases each treatment was preceded by a light sodium amytal narcosis.[3]

End Results.—The end results in this series as shown in Table IX compare as a whole rather favorably with end results of treatment in many other branches of medicine. The present review does not permit any formulation as to what determines these end results. In general it may be stated, however, that the outcome of the treatment is definitely influenced by the type of neurosis and the modes of treatment.

Most recoveries were attained in the anxiety neuroses where the causes could be effectively influenced, and least in the compulsive-obsessive reactions which are accompanied by deep resistive psychosexual distortion. It is generally agreed that the latter are not uniformly cured even by prolonged psychoanalyses. The recoveries in conversion hysteria treated chiefly by suggestion and encouragement were good. The recoveries in anxiety hysteria were better

than was anticipated and the majority of the recoveries in this group were attained by partial analysis and attempts at compromise formation.

Improvement was observed chiefly in anxiety hysteria and in compulsive-obsessive reactions. In the former group the results were due to a combination of several methods among which regimen and hospitalization played a large, though not an exclusive rôle. In the latter group the improvement was due solely to partial analyses.

TABLE IX.

END RESULTS IN THIS SERIES OF 100 CASES.

	Anxiety neurosis.	Conversion hysteria.	Anxiety hysteria.	Compulsive obsessive reactions.	Total No. of cases.
Recovery	9	9	21	2	41
Improvement	..	3	30	8	41
No improvement	..	..	6	3	9
Developed psychoses	..	..	6	..	6
Recurrence	1	2	18	3	24

The failure of improvement in 9 cases, 6 anxiety hysteria and 3 compulsive-obsessive states, is to be ascribed to the severity of clinical conditions, the failure of cooperation or actual resistance on the part of the patients and probably what is most important to a lack of therapeutic acumen.

Six patients developed psychoses. This probably was not due to faulty therapy but poor diagnostic judgment.

Recurrence was observed in 24 cases, 18 of which were anxiety hysterias. The recurrences were traceable in the majority of cases to the incidence of new or reactivated precipitating causes and in many instances to an inadequate treatment of the preceding attack.

SUMMARY AND CONCLUSIONS.

One hundred cases comprising anxiety neurosis, conversion hysteria, anxiety hysteria, compulsive-obsessive reactions and neurasthenia were reviewed from the standpoint of family history, personality, precipitating causes, modes of treatment and end results.

The family history was neuropathic in 44 per cent and psychopathic in 16 per cent of the cases. The personality was neurotic in 75 per cent and psychopathic in 2 per cent of the cases.

The precipitating causes ranged in complexity from ordinary every day emotional strain and faulty contraception, through economic, social and marital conflicts, to profound psychosexual disturbances. In many cases there was more than one precipitating cause. In general the complexity of the causes increased in the following order named: anxiety neurosis, conversion hysteria, anxiety hysteria and compulsive-obsessive reactions.

The modes of treatment were directed toward the relief of symptoms and eradication of causes and varied in complexity from suggestion and sedative drugs to partial analysis. For the majority of cases suggestion, encouragement and drug medication were employed. Regimen and hospitalization were required in about 25 per cent of the cases. Attempts at compromise formation and partial analysis were probably the most effective methods of influencing underlying etiological factors especially in anxiety hysteria and in compulsive-obsessive reactions. In the latter group partial analysis is the only method found to possess worthwhile value.

The end results of treatment in this series compared favorably with those as observed in other branches of medicine.

This study is an attempt to emphasize the importance of comprehensive neuropsychiatric studies and the need for the utilization of various therapeutic approaches. The importance of attempts at compromise formation and partial analysis as therapeutic agents is stressed.

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MENTAL DISEASE AMONG NATIVE AND FOREIGN-BORN WHITES IN NEW YORK STATE.

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During the three fiscal years ended June 30, 1931, there were 15,704 native whites and 10,987 foreign-born whites admitted for the first time to an institution for the treatment of mental disease in New York State. The average annual rates of first admissions per 100,000 corresponding general populations were 58.7 and 115.1, the latter rate being in excess in the ratio of 2.0 to 1. This result is in accord with several earlier studies which showed that foreign whites apparently had about twice the amount of mental disease prevalent among native whites. Such a result, if true, would have several implications. One interpretation would be to the effect that there are racial differences between the two groups—that the races constituting the foreign whites are inferior to those representing the native whites, and that the varying rates of mental disease are therefore indicative of biological differences. The other point of view is based upon observed environmental contrasts between the two groups, and the stressing of these differences as the correct explanations of the variations in rates of mental disease.

In several earlier papers, the present writer showed that the preceding ratio of 2.0 to 1 was spurious.[1] The most important single factor causing fluctuations in rates of mental disease is probably age composition. The incidence of mental disease increases with age. Older groups will therefore tend to have higher rates of first admissions than younger populations. The foreign-born are older than the natives, and consequently, other things being equal, they would tend to have higher rates of mental disease. This source of distortion may be compensated for by the use of standardized rates of first admissions. Thus, using the population of New York State aged 15 years and over on April 1, 1930 as the standard, it was shown that native whites had an annual rate of first admissions of 91.8 per 100,000 population, the foreign-born a rate of 108.8. The latter is in excess in the ratio of only 1.2 to 1.[2]

The corresponding ratio based upon crude rates was 2.0 to 1. In other words, correction for age differences reduced the excess of the foreign rate to only 20 per cent. Furthermore in some of the important groups of psychoses there were no significant differences between the standardized rates of the two groups. Thus with respect to general paresis the native and foreign-born whites had standardized annual rates of first admissions of 8.9 ± 0.3 and 9.8 ± 0.4, respectively; and in the alcoholic psychoses the rates were 6.3 ± 0.2 and 6.7 ± 0.3 for the native and foreign whites, respectively.[3]

It was suggested by the writer that the native and foreign-born whites differ in other important characteristics. The latter are more highly urbanized. They also belong to the more indigent economic and occupational classes. Environment (as measured by degree of urbanization), economic status and occupational grouping are all highly correlated with rates of first admissions. The latter vary directly with increasing degree of urbanization. They are also higher among the poorer classes. The foreign-born live to a greater degree than the natives in urbanized areas. They are also poorer. It is evident, therefore, that these conditions react to the disadvantage of the foreign-born with respect to the incidence of mental disease. If the native and foreign groups could be made comparable with respect to these environmental factors, the relative excess of the foreign rate would be reduced still further. It was suggested, therefore, by the author, that differences between the several nativity groups could be adequately accounted for on environmental grounds without resorting to the introduction of alleged biological factors.

There are no available statistics that would enable us to account adequately for economic and occupational status. On the basis of the federal census of April 1, 1930, however, it is possible to adjust for the environmental differences. Communities are considered urban if they have a population of 2500 or more. Rural communities are defined as those with populations of less than 2500.

Of the 8,958,744 native whites resident in New York State on April 1, 1930, 7,162,818, or 80.0 per cent, were urban. Of the 3,191,549 foreign whites, 2,949,565, or 92.4 per cent, were urban. The necessity of standardizing the rates with respect to environment is thus evident. The standard with respect to environment

was therefore taken to be that of the entire population of New York State, as shown by the federal census of April 1, 1930.

Table I gives three sets of rates of first admissions for native and foreign whites. The first set consists of the "crude" rates, the second set represents rates standardized with respect to environment; and the third set shows rates standardized with respect to both environment and age.

TABLE I.

AVERAGE ANNUAL RATES OF FIRST ADMISSIONS TO ALL INSTITUTIONS FOR MENTAL DISEASE IN NEW YORK STATE, 1929 TO 1931, AMONG NATIVE AND FOREIGN-BORN WHITES, PER 100,000 OF CORRESPONDING POPULATION.

	Males.	Females.	Total.
	Crude rates.		
All natives (A).....	65.4 ± 0.8	52.1 ± 0.7	58.7 ± 0.5
Foreign (B)	125.5 ± 1.9	104.0 ± 1.8	115.1 ± 1.3
Ratio of (B) to (A)...	1.9	2.0	2.0
	Standardized by environment.*		
All natives (A).....	66.0 ± 0.8	51.8 ± 0.7	59.0 ± 0.5
Foreign (B)	118.9 ± 1.8	98.7 ± 1.7	108.8 ± 1.2
Ratio of (B) to (A)...	1.8	1.9	1.8
	Standardized by environment and age.†		
All natives (A).....	106.9 ± 1.3	79.8 ± 1.1	94.2 ± 0.8
Foreign (B)	111.9 ± 1.8	89.4 ± 1.6	101.8 ± 1.2
Ratio of (B) to (A)...	1.04	1.1	1.1

* Urban and rural populations of New York State, as shown by the Federal census of April 1, 1930, taken as standard.

† Population of New York State, aged 15 years and over on April 1, 1930, distributed in accordance with urban-rural ratio of same date, taken as standard.

When standardized by environment, the first admission rate of the native whites was increased from 58.7 to 59.0, and that of the foreign whites was reduced from 115.1 to 108.8. The latter is in excess in the ratio of 1.8 to 1. The corresponding ratio on the basis of crude rates was 2.0 to 1. Correction for environmental differences, therefore, produced an appreciable change in the relative orders of the two rates of first admissions. Among males the rates, standardized for environment, were 66.0 and 118.9 for native and foreign whites, respectively, the latter being in excess in the

ratio of 1.8 to 1. Native white females had a standardized rate of 51.8, foreign white females a standardized rate of 98.7, the latter being in excess in the ratio of 1.9 to 1.

We may next proceed to standardize with reference to both age and environment. The population used as standard was that of the State of New York, aged 15 years and over on April 1, 1930, with urban and rural proportions equivalent to that of the corresponding general population of the state. On this basis, native whites had a first admission rate of 94.2, foreign whites a rate of 101.8, or a ratio of only 1.1 to 1. An original difference of almost 100 per cent on the basis of crude rates has now been reduced to less than 10 per cent, by adjusting for two important demographic and environmental factors, both extraneous to race. In the case of the males the adjusted rate of the foreign whites was in excess of that of native whites in the ratio of only 1.04 to 1. Among females, the rate of the foreign whites was in excess in the ratio of 1.1 to 1. It is reasonably certain that additional adjustment for economic and occupational status would reduce still further the difference between the rates of the native and foreign-born whites. We, therefore, feel justified in concluding, that there are no essential differences in the relative incidence of mental disease between the native and foreign-born whites in New York State, as measured by rates of first admissions.

In the following sections we shall consider rates of first admissions for several of the more important groups of psychoses.

Psychoses with Cerebral Arteriosclerosis.

Native and foreign-born whites had average annual "crude" rates of 7.3 and 18.2, respectively, the latter being in excess in the ratio of 2.5 to 1. Standardization on the basis of environment resulted in corresponding rates of 7.4, and 17.3, and the ratio was reduced to 2.3 to 1. We next proceed to a double standardization on the basis of environment and age. The standard with respect to age was the population of New York State aged 45 years and over, as shown by the federal census of April 1, 1930. The standard with respect to environment was described in the previous section. We now find that native and foreign whites had rates of 41.0 and 41.1, respectively. In other words, instead of being in excess by over 100 per cent, foreign whites had an annual rate of first ad-

missions with psychoses with cerebral arteriosclerosis equivalent to that of native whites, when proper consideration is given to age and environmental composition.

In the case of the males, foreign whites had a "crude" rate in excess by 132 per cent. On the basis of double standardization, however, the native whites had a rate of 49.2, the foreign whites a rate of 44.4, or the former was in excess in the ratio of 1.1 to 1. Among females, the rates, standardized for age and evironment,

TABLE II.

AVERAGE ANNUAL RATES OF FIRST ADMISSIONS WITH PSYCHOSES WITH CEREBRAL ARTERIOSCLEROSIS TO ALL INSTITUTIONS FOR MENTAL DISEASE IN NEW YORK STATE, 1929 TO 1931, AMONG NATIVE AND FOREIGN-BORN WHITES, PER 100,000 OF CORRESPONDING POPULATION.

	Males.	Females.	Total.
	Crude rates.		
All natives (A).....	8.5 ± 0.3	6.0 ± 0.2	7.3 ± 0.2
Foreign (B)	19.7 ± 0.7	16.7 ± 0.7	18.2 ± 0.5
Ratio of (B) to (A)...	2.3	2.8	2.5
	Standardized by environment.*		
All natives (A).....	8.6 ± 0.3	6.2 ± 0.2	7.4 ± 0.2
Foreign (B)	18.7 ± 0.7	15.8 ± 0.7	17.3 ± 0.5
Ratio of (B) to (A)...	2.2	2.5	2.3
	Standardized by environment and age.†		
All natives (A).....	49.2 ± 1.7	30.0 ± 1.3	41.0 ± 1.1
Foreign (B)	44.4 ± 1.7	34.2 ± 1.6	41.1 ± 1.2
Ratio of (B) to (A)...	0.9	1.1	1.0

* Urban and rural populations of New York State, as shown by the Federal census of April 1, 1930, taken as standard.

† Population of New York State, aged 45 years and over on April 1, 1930, distributed in accordance with urban-rural ratio of same date, taken as standard.

were 30.0 for native and 34.2 for foreign whites, the latter being in excess in the ratio of 1.1 to 1.

Summarizing the preceding results we may say that there are no essential differences in the incidence of psychoses with cerebral arteriosclerosis among native and foreign whites, when age and environment are taken into consideration. The presumption, in addition, is that foreigners would have lower rates, if further corrections for environmental differences, such as economic and occupational status, were made.

General Paresis.

During the three years ended June 30, 1931 there were 2524 white first admissions with general paresis to all institutions for mental disease in New York State. Of these, 1365 were native and 1153 foreign-born. The nativity was unascertained in six cases. Rates of first admissions are shown in Table III.

TABLE III.

Average Annual Rates of First Admissions With General Paresis to All Institutions for Mental Disease in New York State, 1929 to 1931, Among Native and Foreign-Born Whites, Per 100,000 of Corresponding Population.

	Males.	Females.	Total.
	Crude rates.		
All natives (A).....	7.9 ± 0.3	2.4 ± 0.2	5.1 ± 0.2
Foreign (B)	19.7 ± 0.7	3.9 ± 0.3	12.1 ± 0.4
Ratio of (B) to (A)...	2.5	1.6	2.4
	Standardized by environment.*		
All natives (A).....	8.1 ± 0.3	2.4 ± 0.2	5.7 ± 0.2
Foreign (B)	18.2 ± 0.7	3.9 ± 0.3	11.1 ± 0.4
Ratio of (B) to (A)...	2.2	1.6	1.9
	Standardized by environment and age.†		
All natives (A).....	14.7 ± 0.5	4.1 ± 0.2	9.3 ± 0.3
Foreign (B)	15.2 ± 0.7	3.5 ± 0.3	9.3 ± 0.4
Ratio of (B) to (A)...	1.03	0.9	1.0

* Urban and rural populations of New York State, as shown by the Federal census of April 1, 1930, taken as standard.
† Population of New York State, aged 15 years and over on April 1, 1930, distributed in accordance with urban-rural ratio of same date, taken as standard.

On the basis of crude rates of first admissions, the foreign-born whites exceeded the native-born whites in the ratio of 2.4 to 1. When standardized according to environment, the rates were in the ratio of 1.9 to 1. When standardized according to both environment and age, the native and foreign-born whites both had rates of 9.3 per 100,000 population aged 15 years and over. In the case of the males the ratios were 2.5 to 1 on the basis of crude rates, and only 1.03 to 1 when the rates were standardized according to environment and age. In the case of the females, the crude rate of the foreign-born was in excess in the ratio of 1.6 to 1. When

standardized, however, with respect to both environment and age, the natives had a rate of 4.1, compared with 3.5 for the foreign-born whites, the former being in excess in the ratio of 1.2 to 1.

Even without further corrections for economic and occupational differentials, the evidence is therefore clear that the foreign-born do not possess higher rates of first admissions with general paresis than do native whites.

Alcoholic Psychoses.

There were 1572 white first admissions with alcoholic psychoses during the three years ended June 30, 1931, of whom 859 were native and 711 foreign-born. The nativity was unascertained in

TABLE IV.

Average Annual Rates of First Admissions With Alcoholic Psychoses to All Institutions for Mental Disease in New York State, 1929 to 1931, Among Native and Foreign-Born Whites, Per 100,000 of Corresponding Population.

	Males.	Females.	Total.
	Crude rates.		
All natives (A).....	5.5 ± 0.2	1.0 ± 0.1	3.2 ± 0.1
Foreign (B)	12.3 ± 0.6	2.2 ± 0.3	7.4 ± 0.3
Ratio of (B) to (A)...	2.2	2.2	2.3
	Standardized by environment.*		
All natives (A).....	5.3 ± 0.2	1.0 ± 0.1	3.1 ± 0.1
Foreign (B)	11.6 ± 0.6	2.0 ± 0.2	6.8 ± 0.3
Ratio of (B) to (A)...	2.2	2.0	2.2
	Standardized by environment and age.†		
All natives (A).....	10.8 ± 0.4	1.9 ± 0.2	6.3 ± 0.2
Foreign (B)	10.7 ± 0.6	1.9 ± 0.2	6.3 ± 0.3
Ratio of (B) to (A)...	1.0	1.0	1.0

* Urban and rural populations of New York State, as shown by the Federal census of April 1, 1930, taken as standard.
† Population of New York State, aged 20 years and over on April 1, 1930, distributed in accordance with urban-rural ratio of same date, taken as standard.

two cases. Rates of first admissions with alcoholic psychoses are shown in Table IV.

On the basis of crude rates, the incidence of alcoholic psychoses among foreign-born whites exceeded that among native whites in

the ratio of 2.3 to 1. Standardization according to environment reduced the excess slightly to a ratio of 2.2 to 1. Further standardization according to age resulted in a rate of 6.3 per 100,000 population aged 20 years and over for both native and foreign-born whites. In the case of white males, native and foreign-born had crude rates of 5.5 and 12.3, respectively; but standardization for both environment and age resulted in rates of 10.8 and 10.7, respectively. Among white females, the crude rates were in the ratio of 2.2 to 1, the foreign rate being in excess, but consideration of environmental and age differences resulted in a rate of 1.9 for both groups.

Crude rates of first admissions consequently gave an entirely distorted picture of the relative incidence of alcoholic psychoses among native and foreign whites. Proper adjustment for age and environmental differences showed that these two population groups had equivalent rates. There would undoubtedly be a still further reduction in the rates of the foreign-born whites, were it possible to adjust for economic and occupational status.

Manic-Depressive Psychoses.

White first admissions with manic-depressive psychoses totaled 3621 in New York State during the three years ended June 30, 1931, of whom 2192 were native and 1423 foreign-born. The nativity was unascertained in six cases. Rates of first admissions are shown in Table V.

Native and foreign whites had crude rates of first admissions of 8.2 and 14.9, respectively, the latter being in excess in the ratio of 1.8 to 1. The ratio remained unchanged when environment was taken into consideration. Adjustment for age differences, however, resulted in rates of 12.2 and 14.8 for native and foreign-born whites, respectively, the latter being in excess in the ratio of 1.2 to 1. The difference is statistically significant.

In the case of the white males, the crude rate of the foreign-born was in excess in the ratio of 1.6 to 1. Standardizing for both age and environment resulted in rates of 10.7 for the foreign-born and 10.1 for the native-born, or the former was in excess in the ratio of 1.1 to 1. The difference is not statistically significant. In the case of the white females, the foreign-born had a crude rate

in excess of that of the natives in the ratio of 2.0 to 1. The process of double standardization resulted in rates of 14.4 for native females and 19.0 for foreign-born females, the latter being in excess in the ratio of 1.3 to 1. The difference is statistically significant.

Recalling, however, that other important environmental factors have not been accounted for, one may feel sale in concluding that the difference in rates between the two groups is subject to a still further sensible reduction.

TABLE V.

AVERAGE ANNUAL RATES OF FIRST ADMISSIONS WITH MANIC-DEPRESSIVE PSYCHOSES TO ALL INSTITUTIONS FOR MENTAL DISEASE IN NEW YORK STATE, 1929 TO 1931, AMONG NATIVE AND FOREIGN-BORN WHITES, PER 100,000 OF CORRESPONDING POPULATION.

	Males.	Females.	Total.
	Crude rates.		
All natives (A).....	6.7 ± 0.3	9.6 ± 0.3	8.2 ± 0.2
Foreign (B)	11.0 ± 0.6	19.1 ± 0.8	14.9 ± 0.5
Ratio of (B)to (A)...	1.6	2.0	1.8
	Standardized by environment.*		
All natives (A).....	6.4 ± 0.3	9.4 ± 0.3	7.9 ± 0.2
Foreign (B)	10.4 ± 0.5	17.7 ± 0.7	14.1 ± 0.4
Ratio of (B) to (A)...	1.6	1.9	1.8
	Standardized by environment and age.†		
All natives (A).....	10.1 ± 0.4	14.4 ± 0.5	12.2 ± 0.3
Foreign (B)	10.7 ± 0.5	19.0 ± 0.8	14.8 ± 0.5
Ratio of (B) to (A)...	1.1	1.3	1.2

* Urban and rural populations of New York State, as shown by the Federal census of April 1, 1930, taken as standard.
† Population of New York State, aged 15 years and over on April 1, 1930, distributed in accordance with urban-rural ratio of same date, taken as standard.

DEMENTIA PRÆCOX.

White first admissions with dementia præcox to all institutions for mental diseases in New York State during the three years ended June 30, 1931 totaled 6962, of whom 4067 were native and 2883 foreign-born. The nativity was unascertained in 12 cases. Rates of first admissions are shown in Table VI.

Native and foreign-born whites had "crude" rates of 15.2 and 30.2, respectively, the latter being in excess in the ratio of 2.0 to 1. Adjustment for environmental differences reduced the excess slightly to a ratio of 1.9 to 1. Standardizing for both environment and age resulted in rates of 23.8 and 32.5 for native and foreign-born, respectively, the latter being in excess in the ratio of 1.4 to 1. In the case of the males the "crude" rates were in the ratio of 1.8 to 1, the rate of the foreign-born being in excess. The rates

TABLE VI.

AVERAGE ANNUAL RATES OF FIRST ADMISSIONS WITH DEMENTIA PRÆCOX TO ALL INSTITUTIONS FOR MENTAL DISEASE IN NEW YORK STATE, 1929 TO 1931, AMONG NATIVE AND FOREIGN-BORN WHITES, PER 100,000 OF CORRESPONDING POPULATION.

	Males.	Females.	Total.
	Crude rates.		
All natives (A).....	17.3 ± 0.4	13.2 ± 0.4	15.2 ± 0.3
Foreign (B)	31.4 ± 0.9	28.9 ± 0.9	30.2 ± 0.7
Ratio of (B) to (A)...	1.8	2.2	2.0
	Standardized by environment.*		
All natives (A).....	18.6 ± 0.4	13.8 ± 0.4	16.2 ± 0.3
Foreign (B)	30.7 ± 0.9	29.3 ± 0.9	30.0 ± 0.7
Ratio of (B) to (A)...	1.7	2.1	1.9
	Standardized by environment and age.†		
All natives (A).....	26.7 ± 0.6	21.1 ± 0.6	23.8 ± 0.4
Foreign (B)	36.2 ± 1.0	29.2 ± 0.9	32.5 ± 0.7
Ratio of (B) to (A)...	1.4	1.4	1.4

* Urban and rural populations of New York State, as shown by the Federal census of April 1, 1930, taken as standard.
† Population of New York State, aged 15 years and over on April 1, 1930, distributed in accordance with urban-rural ratio of same date, taken as standard.

were in the ratio of 1.7 to 1 when standardized according to environment, and in the ratio of 1.4 to 1 when standardized according to both age and environment. Among females there was a similar reduction in the disparity of the rates. On the basis of "crude" rates, the foreign-born were in excess in the ratio of 2.2 to 1. But when standardized according to age and environment the ratio was 1.4 to 1. With respect to dementia præcox, therefore, foreigners appear to have significantly higher rates of first admissions. There would probably be a further reduction in the relative excess of the rate of the foreign-born, if economic and occupational

status could be rendered comparable for the two groups. In all probability, however, the rate of the foreign-born would still remain in significant excess.

Comparing rates of first admissions among native and foreign-born whites, we find that, after due consideration of age and environmental differences, the latter exceed the former by only 8 per cent. In several of the more important groups of psychoses there are no significant differences between the rates of the two groups. It is highly probable that if proper corrections could be made for other environmental differences, such as economic and occupational status, the remaining discrepancies in rates of first admissions would be either eliminated, or reduced to a degree easily reconcilable with a theory of environmental differentials.

There is no need to invoke the hypothesis of biological differences between native and foreign-born whites. However, we cannot, on the basis of the preceding data, go further and assume that there are no racial differences of any kind with respect to mental disease. That there are differences of a truly racial order between negroes and whites, for example, or between Japanese and whites, appears reasonably probable. Negroes, for example, not only have higher rates of mental disease than whites, but there are also qualitative differences suggesting racial attributes.[4] But it is the thesis of this study that though some inter-racial differences with respect to mental disease appear highly probable, there is no evidence to indicate the existence of intra-racial differences within the white race, as represented by native and foreign groups in New York State. Within each race, there are further differentiations with respect to environment and ways of life; and these appear adequate to account for the difference in rates of mental disease within the sub-groups of a single race.

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RELATIONSHIP BETWEEN THE CEREBROSPINAL FLUID SUGAR AND BLOOD SUGAR IN UNTREATED NEUROSYPHILIS.

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Exclusive of sugar, interest in the ratio of the various chemical substances in the cerebrospinal fluid to those in the blood has been productive of a general literature not too restricted in scope. The reasons for this interest and the historical background of this field have been reviewed so many times that to repeat either is unnecessary.

The literature on the ratio of cerebrospinal fluid sugar to blood sugar in neurosyphilis, on the other hand, is practically non-existent. Occasionally, inserted in other works on sugar, there are reported cerebrospinal fluid and blood sugar studies on cases of neurosyphilis but with no attempt at correlation. For some reason the ratio has not been considered of sufficient importance to warrant study and is stated as normal. It is felt that gaps of this sort in the chemistry of neurosyphilis should not exist.

This paper is intended to supply the material whereby this gap, the ratio of cerebrospinal fluid sugar to blood sugar, may be filled. It is also intended in the following survey of literature to show that the field is not as stable nor cleared of problems as it could be, that the so-called solved problems are not solved at all, and that much work upon apparently unimportant phases of the field may be productive of valuable information. Sugar in neurosyphilis has too long been an unimportant phase of an important disease. The results herein presented, it is felt, justify such a belief and warrant further research.

Preceding the interest in ratios, and still accumulating, is a body of literature on the measurement of chemical compounds individually in the cerebrospinal fluid and blood in pathological states and in normal individuals. In this latter field much work has accumulated on sugar in normal cerebrospinal fluid and blood. But, after all this work, there is no unanimity of opinion nor of results. For

this some workers blame the methods used; others, the manner of handling the methods; while still others feel that the lack of uniformity is due to a small sampling of cases. And there is, of course, the group who blame the workers who have presented as normals, estimations on individuals in whom there was no attempt to regulate the food intake prior to the examination.

Unquestionably, all of these factors contribute to the scatter of results which produce divergent normals, but there is still another reason why the obtained normal range varies so much, *i. e.*, the selection of the normal case. In a survey of the papers interested in the establishment of the normal sugar range, many writers omit entirely a presentation of the diagnostic background of their cases, while others present it colored with psychoses, psychoneuroses, psychopathic personalities, syphilis, arthritis, multiple sclerosis, migraine, general paralysis, tabes, pneumonia and a host of other diseases. From such a heterogenous group "normals" are drawn.

For "normal" blood sugar there are reported ranges of 73-93 mg.,[25] 92-108 mg.,[3] 100-130 mg.,[8] 70-120 mg.,[6] 90-120 mg.,[41] 65-100 mg.,[42] 80-120 mg.,[10] 80-110 mg.,[11] 85-125 mg.,[39] 95-135 mg.[13]; for normal cerebrospinal fluid sugar, 40-54 mg.,[25] 48-63 mg.,[3] 50-75 mg.,[8] 40-60 mg.,[9] 40-70 mg.,[41] 55-65 mg.,[26] 53-84 mg.,[1] 60-65 mg.,[40] 55 mg.,[18] 40-68 mg.,[27] 55-110 mg.,[20] 50-139 mg.,[31] 55.5 mg.,[28] 46 mg.,[19] 64 mg.,[15] 64-90 mg.,[22] 44-56 mg.,[24] 50 mg.,[12] 70 mg.[21]; and for the "normal" ratio of cerebrospinal fluid sugar to blood sugar, 46-64 per cent,[25] 53 per cent,[3] 64 per cent,[8] 3:2,[6] about half,[41] about 50 per cent [42] and 2:1.[25]

And when a search is made into the literature of neurosyphilis there are found the same methods which caused such diverging normal ranges, the same small sampling of cases, sometimes the same lack of attempt to regulate the food intake, and the same lack of use of the pure case of neurosyphilis. Sometimes it is stated that they are treated or untreated. And the result of such studies is, of course, that the blood sugar in neurosyphilis is "normal" (Matowetsky,[25] Dietel,[8] Blum,[3] etc.). Schube,[32] on the other hand, in a study of 211 cases of neurosyphilis uncomplicated by physical disease other than syphilis and untreated, found that 9.7 per cent of the individuals had blood sugar values which were *not* within the range of "normal" by the Folin-Wu method.

The cerebrospinal fluid sugar in neurosyphilis, under experimental conditions similar to that for the blood sugar has been found to range from 40 to 118 mg. In undifferentiated neurosyphilis it has been found increased,[5, 7, 17, 43] decreased,[18, 4, 2, 14, 24] and normal.[16, 20, 30] In general paresis it has been found increased,[7] decreased,[18, 4, 14, 29] and normal.[2, 30, 38] Average cerebrospinal fluid sugar values in neurosyphilis have been found to be 65 mg.,[1] 71.8 mg.,[44] and 91.5 mg.[20] Schube [33] in a study of 435 cerebrospinal fluid sugars from cases of untreated neurosyphilis found the range to be 40 to 112 mg. with a mean value of 62.75 mg.; in general paresis the range was 40 to 107 mg. with a mean value of 62.97 mg.; in tabes without psychosis 42 to 112 mg. with a mean value of 64.36 mg.; and in cerebrospinal syphilis with psychosis 40 to 86 mg. with a mean value of 61.05 mg.

METHOD.

The cerebrospinal fluids and bloods used in this study were from cases of neurosyphilis, uncomplicated by physical disease other than syphilis. The cases were untreated. The diagnosis was established through history, psychiatric and physical examination, and laboratory study of the individual patient. The minimum of laboratory findings for the satisfactory selection of the case were: a positive blood Wassermann, a positive cerebrospinal fluid Wassermann, a positive Lange colloidal gold curve, and a positive colloidal carbon test of Schube.[34, 35]

There were 197 cases of neurosyphilis of which 165 were cases of general paresis, 20 were cases of cerebrospinal syphilis with a psychosis, and 12 were cases of tabes without psychosis. Of these cases 156 were males and 41 females. The age range was 22 to 66 years with the distribution: 20-29.9 years, 10 cases (6 male, 4 female), 30-39.9 years, 63 cases (49 male, 14 female), 40-49.9 years, 71 cases (53 male, 18 female), 50-59.9 years, 39 cases (28 male, 11 female), 60-69.9 years, 14 cases (10 male, 4 female). This age range, and the sex and numerical distribution therein, are representative. In a study of 300 cases of neurosyphilis Schube [38] found an age and sex distribution quite comparable.

The controls were a group of individuals whose selection was based upon only three things; *i. e.*, they were established from clinical and laboratory points of view as non-syphilitic; none of

them possessed any definitely determinable physical disease; all of them were definitely psychotic. The blood and cerebrospinal fluid specimens were obtained from them under conditions identical to those for the cases of neurosyphilis. The ratios obtained from them will be used as a basis of comparison.

There were 24 controls. Of these, 12 were men and 12 were women. The age range was 18 to 50 years with the distribution: 20-29.9 years, 6 cases (4 male, 2 female), 30-39.9 years, 12 cases (7 male, 5 female), 40-49.9 years, 6 cases (3 male, 3 female). This age range and sex distribution, it is felt, are fairly representative. The psychoses consisted of dementia præcox, 5 cases; manic depressive, depressed, 10 cases; manic depressive, manic, 2 cases; alcoholic hallucinosis, 2 cases; psychosis with mental deficiency, 1 case; psychosis with cerebral arteriosclerosis, 2 cases; and undiagnosed psychosis, 2 cases.

The blood and cerebrospinal fluid were obtained simultaneously and under sterile conditions from each individual in the morning, after a fast which had lasted a minimum of 16 hours. The fluids were placed immediately in an ice bath and transferred to an ice box where they were kept a short period before they were examined chemically. This short period did not alter the sugar content of the spinal fluid, for acording to Schube,[36] cerebrospinal fluids which have been kept in an ice box at 10° C. for a period of 21 days show no appreciable alteration in sugar content. Likewise, the short period did not affect the blood sugar.[37]

The method of determination of the blood sugar was the Folin-Wu.[10] The method of determination of the cerebrospinal fluid sugar was an application of the same procedure wherein the cerebrospinal fluid was treated with 0.5 cc. of 10 per cent sodium tungstate solution and then with 0.5 cc. of $\frac{2}{3}$ N sulphuric acid to precipitate the protein. After centrifugalization, the clear protein-free supernatant fluid (a 1 : 1 dilution of the original cerebrospinal fluid) was used for determination of its dextrose content by the Folin-Wu blood sugar procedure. The sugar content was expressed as mg. of glucose per 100 cc. of fluid.

The control blood sugar as determined by this method is 80 to 120 mg. per 100 cc. of whole blood; the control spinal fluid sugar as determined by this method is 40 to 80 mg. per 100 cc. of spinal fluid.

The ratio of the cerebrospinal fluid sugar to the blood sugar was obtained by dividing the blood sugar by the cerebrospinal fluid sugar, the result indicating the multiple of the cerebrospinal fluid sugar represented by the blood sugar.

In the control series the ratio blood sugar/cerebrospinal fluid sugar was from 1.19 to 1.80. The ratio in the two sexes was negligible (male: 1.2 to 1.77, female: 1.3 to 1.7 respectively). For this study these values will be considered as normal controls.

RESULTS.

The detailed distribution and salient facts of the blood sugar and the cerebrospinal fluid sugar in the individual case are presented in Tables 1 and 2 and Chart 1.

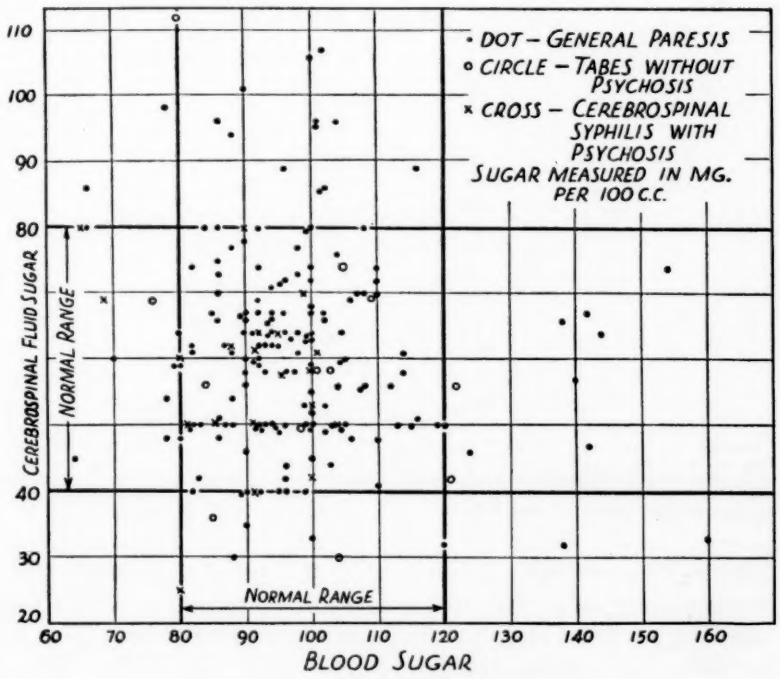

CHART 1.

CHART 1.—This chart is designed to show the distribution of the sugar as measured in the blood and cerebrospinal fluid in the individual case. The normal range for sugar in the cerebrospinal fluid is delineated by the horizontal lines, for the blood by the vertical lines. The block enclosed by both indicates the range allowed for the normal blood sugar or cerebrospinal fluid sugar or for both.

The detailed distribution and salient facts of the ratio obtained by dividing the blood sugar by the cerebrospinal fluid sugar are presented in Tables 3 and 4.

A study of these tables and the chart reveals the following facts:

(a) In the individual case in the majority of instances the cerebrospinal fluid sugar (neurosyphilis, 88.2 per cent; general

TABLE 1.

Interval—10 mgm. per 100 cc.	Total—neurosyphilis.		General paresis.		Cerebrospinal syphilis with psychosis.		Tabes without psychosis.	
	Sugar.							
	Spinal fluid.	Blood.	Spinal fluid.	Blood.	Spinal fluid.	Blood.	Spinal fluid.	Blood.
25-34	7	..	5	..	1	..	1	..
35	17	..	13	..	2	..	2	..
45	47	..	41	..	5	..	1	..
55	58	1	46	1	8	..	4	..
65	40	5	35	3	2	2	3	..
75	14	22	12	16	2	3	..	3
85	6	63	6	55	..	7	..	1
95	5	67	5	55	..	8	..	4
105	3	22	2	20	..	..	1	2
115	..	9	..	7	..	..	..	2
125	..	0	..	0	..	..	..	..
135	..	6	..	6	..	..	..	..
145	..	1	..	1	..	..	..	..
155	..	1	..	1	..	..	..	..
Total	197	197	165	165	20	20	12	12

In this table the blood sugar and spinal fluid sugar values are grouped into 10 mgm. intervals. The use of intervals such as the above (25 instead of 20, 35 instead of 30, etc.) was to permit the inclusion of those sugar values slightly below and slightly above normal which might be in just such a position due to the experimental error of the method. It is true that this seems to pad the normal range. To prevent this the facts in table 2 should be studied.

paresis, 88.4 per cent; cerebrospinal syphilis with psychosis 95.0 per cent; and tabes without psychosis 74.9 per cent) and/or the blood sugar (neurosyphilis, 89.2 per cent; general paresis, 90.2 per cent; cerebrospinal syphilis with psychosis, 90.0 per cent; and tabes without psychosis, 74.9 per cent) are within the limits of the normal sugar range. (Tables 1 and 2.)

(b) The relationship of the cerebrospinal fluid sugar to the blood sugar is by no means a constant factor in a given diagnostic

TABLE 2.

Type case.	Total No. cases.	Range sugar.		Mean sugar.		Sugar.											
						Within normal.				Below normal.				Above normal.			
						Blood.		Spinal fluid.		Blood.		Spinal fluid.		Blood.		Spinal fluid.	
		Blood.	Spinal fluid.	Blood.	Spinal fluid.	No. cases.	Per cent.	No. cases.	Per cent.	No. cases.	Per cent.	No. cases.	Per cent.	No. cases.	Per cent.	No. cases.	Per cent.
Neurosyphilis.....	197	55–155	25–105	98.5	60.9	176	89.2	174	88.2	10	5.07	9	4.5	11	5.57	14	7.0
General paresis.....	165	55–155	25–105	97.8	58.5	149	90.2	146	88.4	7	4.24	6	3.6	9	5.45	13	7.8
Cerebrospinal syphilis with psychosis.....	20	65–95	25–75	91.5	60.0	18	90.0	19	95.0	2.0	10.0	1	5.0	0	0	0	0
Tabes without psychosis.....	12	75–115	25–105	100.8	60.0	9	74.9	9	74.9	1.0	8.3	2	16.6	2	16.6	1	8.33

This table shows the mean value, the number and the percentage of cases in which the sugar in the blood and/or cerebrospinal fluid was below, within and above normal limits.

TABLE 3.

Type of case.	Total No. case.	Case frequency distribution (grouped).																														
		0.69-0.79	0.79-0.89	.89	.99	1.09	1.19	1.29	1.39	1.49	1.59	1.69	1.79	1.89	1.99	2.09	2.19	2.29	2.39	2.49	2.59	2.69	2.79	2.89	2.99	3.09	3.33	3.46	3.70	4.31	4.84
Neurosyphilis	197	3	3	3	7	10	10	20	21	23	20	7	12	11	9	5	9	8	4	1	2	0	1	1	2	0	1	1	1	1	1
General paresis	165	2	2	3	6	8	10	19	15	21	15	5	10	10	8	4	9	5	4	1	2	0	0	1	2	0	0	0	1	1	1
Cerebrospinal syphilis with psychosis	20	0	1	0	1	1	0	1	5	0	5	0	2	0	1	0	0	2	0	0	0	0	0	0	0	0	1	0	0	0	0
Tabes without psychosis	12	1	0	0	0	1	0	0	1	2	0	2	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0
								Normal																								

This table shows the distribution of the ratios which were obtained by dividing the blood sugar by the cerebrospinal fluid sugar in the individual case. Each ratio is a measure of the permeability of the blood-cerebrospinal fluid barrier for sugar.

entity; for even though the cerebrospinal fluid sugar and the blood sugar are within the normal range in a group of individuals, when the individual cases are graphically represented the scatter within the normal range is wide; such a scatter is not only true for one diagnostic group but for all. (Chart 1.)

(c) When the ratio of the cerebrospinal fluid sugar to the blood sugar is obtained by dividing the blood sugar value by the cerebrospinal fluid sugar value the resulting factor is not always within the normal range even though the cerebrospinal fluid sugar and blood sugar are both normal; thus regardless of the high percentage

TABLE 4.

Type of case.	Total No. cases.	Ratio of cerebrospinal fluid sugar to blood sugar.							
		Mean ratio.	Within normal ratio.		Below normal ratio.		Above normal ratio.	
			No. cases.	Per cent.	No. cases.	Per cent.	No. cases.	Per cent.
Neurosyphilis.....	197	1.42	101	51.2	26	13.2	70	35.6
General paresis.....	165	1.41	85	51.5	21	12.7	59	35.8
Cerebrospinal syphilis with psychosis.....	20	1.58	11	55	3	15	6	30
Tabes without psychosis.....	12	1.61	5	41.7	2	16.6	5	41.7

This table shows the mean ratio of the cerebrospinal fluid sugar to blood sugar, and the number and percentage of these ratios below, within and above normal.

of normal cerebrospinal fluid and blood sugars in the study, in neurosyphilis 48.8 per cent of the ratios were not within normal limits (13.2 per cent below and 35.6 per cent above normal), in general paresis, 48.5 per cent (12.7 per cent below and 35.8 per cent above normal), in cerebrospinal syphilis with psychosis, 45 per cent (15 per cent below and 30 per cent above normal), and in tabes without psychosis 58.3 per cent (16.6 per cent below and 41.7 per cent above) of the ratios were not within normal limits. (Tables 3 and 4.)

DISCUSSION.

It has been stated many times, and by many individuals, that the sugar in the cerebrospinal fluid and blood in neurosyphilis is

always normal. This has become so firmly established in literature, that when normal cerebrospinal fluid or blood sugars are desired for control or other studies there is apparently no hesitancy in the use of sugars from cases of neurosyphilis for this purpose. If we accept as normal a range similar to the one used in this paper, and which is entirely satisfactory for the method, it is obvious that the sugar values in cases of neurosyphilis cannot be used as normal but can be considered only as the sugar values of neurosyphilis. It is true that the majority of these values in neurosyphilis fall within the normal range (88.2 per cent cerebrospinal fluid sugar and 89.2 per cent blood sugar), but that fact does not give one license to consider *all* of them as normal. From this study it is obvious that 1 in 10 sugars in the cerebrospinal fluid or the blood is either below or above normal; the chances of it being either are about equally divided. This statement refers only to untreated cases that are uncomplicated by disease other than syphilis.

In Table 4 another fact is clearly established, *i. e.*, that in cases of neurosyphilis the ratio of cerebrospinal fluid sugar to the blood sugar in a large number of cases (48.8 per cent) is not within the arbitrarily established normal range. In 35.6 per cent of the cases the permeability of the hemato-encephalic barrier is increased and in 13.2 per cent of the cases it is decreased.

Thus, even though in the majority of cases the cerebrospinal fluid sugar or the blood sugar is within the normal range, when the relationship of the cerebrospinal fluid sugar to the blood sugar in the individual case is studied, it is at once obvious that in half of the cases (48.8 per cent) there is some abnormal functioning of the blood-cerebrospinal fluid barrier for sugar.

In the sub-groups these facts likewise hold fairly well with individual variations, some large, some small, and these variations and facts can more adequately be obtained from the chart and tables than in any other manner.

Although there has been much discussion on just what is the cerebrospinal fluid-blood barrier, the existing literature supports very well the view that it consists of the choroid plexus, ependyma, leptomeninges, cerebrospinal vessels and neuroglia. In some manner as yet unexplained there exists in normal individuals a certain ratio between the normal constituents of the cerebrospinal fluid and those of the blood; and also between the substances artificially

introduced into the blood stream and the amounts of these substances which in certain instances, have, in some manner, been able to get into the cerebrospinal fluid.

The methods whereby normally existing or artificially introduced substances manage to get into the cerebrospinal fluid are likewise the subject of much debate, some individuals contending that the passage is due to the secretory ability of the barrier, while others argue that it is due to dialysis. The problem is obviously unsolved.

The barrier has also been studied in various pathological conditions, the results being recorded in terms of increased permeability (low ratio) and decreased permeability (high ratio) as well as normal permeability (normal ratio). These results have been interpreted in terms of the effect of the disease process on the body organs as a whole and on them as individual entities (arteries of barrier, colloid-crystalloid state of the blood, barrier selectivity and selective pathology of barrier). Again the existence of actual explanatory facts is lacking.

The same conditions, the same explanations and arguments, with variations, hold true for neurosyphilis so that at the present there exists no satisfactory explanation of the observed findings. The pathological process set up by the neurosyphilis may have altered the secretory properties of the barrier; it may have altered the dynamics of dialysis, *i. e.,* changes in the barrier, changes in the chemical-physical state of the blood or blood vessels, or changes in the cerebrospinal fluid. However, if this were true, and it may be, the changes existing should hold true for all cases of neurosyphilis with, for results, a graded ratio which depends upon the degree of change induced by the neurosyphilis. A survey of this paper shows that this is not so, and therefore, other explanations must be sought.

In any survey of neurosyphilis several things must be considered: (a) the individual, (b) his personality prior to, during and after the neurosyphilis, (c) his external environment and (d) the neurosyphilis and its treatment. If the neurosyphilis and its treatment are removed from this scheme of things there remains the individual with his personality reacting to his total environment. Under average conditions there exist in most individuals chemical, physiological, emotional and intellectual spheres which can be called normal. Under these same average conditions certain in-

dividuals will react abnormally in one or more of these spheres. So it is hardly reasonable to expect, for instance, the exact chemistry of these two types to be the same. There is accumulating evidence to show this to be true. Under abnormal conditions there exist these same two types, although not groups, of individuals. Neurosyphilis is certainly an abnormal condition for any individual to encounter, and it might justly be expected that every individual encountering such an abnormal environmental condition would react to it in an abnormal manner. But individuals react to this disease in the same manner as they react to any given environment. Some remain entirely within normal limits, some react abnormally. Those who react abnormally may do so because of several probable reasons, *i. e.*, (a) pathological alterations produced by the syphilis or its products, (b) psychic trauma caused by the knowledge of the possession of the disease, (c) coincident onset of abnormal reaction due to other causes, and (d) combinations of these.

It is hardly plausible to expect individuals who react normally to neurosyphilis to present a body chemistry identical with that of individuals who react abnormally to neurosyphilis. Again it is impossible to expect the chemistry of an individual reacting abnormally to neurosyphilis because of pathological alterations to be the same as that of the individual reacting to the psychic trauma only. And in the study of a group of individuals with neurosyphilis the chemistry shows such variations. This fact is further substantiated by the present study of the hemato-encephalic barrier for sugar.

Thus given the hemato-encephalic barrier with its capability for physiological and pathological alteration (*i. e.*, increased, normal or decreased secretory or dialysis powers dependent upon (a) organic changes in the choroid plexus exclusive of the blood vessels (b) changes in the blood vessels therein of a physical or chemical nature (c) changes in the chemical or physical state of the blood and/or cerebrospinal fluid and (d) combinations of these) it is not unreasonable to assume that alterations in this barrier can occur temporarily or permanently because of the reaction of the individual and his personality to the (1) pathology (transient or permanent) produced by the syphilis, (2) psychic trauma caused by the knowledge of syphilitic contact, (3) the coincident existence of an alien psychosis, and (4) combinations of these—the result being measured in the mathematical terms of physics or chemistry.

SUMMARY.

A study of the simultaneous fasting cerebrospinal fluid sugar and blood sugar in untreated neurosyphilis is presented.

The cerebrospinal fluid sugar was within normal range in 88.2 per cent of the cases and the blood sugar in 89.2 per cent.

The ratio existing between the cerebrospinal fluid sugar and the blood sugar was within the normal range in only 51.2 per cent of the cases of neurosyphilis: 51.5 per cent of the cases of general paresis, 55 per cent of the cases of cerebrospinal syphilis with psychosis, and in 41.7 per cent of the cases of tabes without psychosis.

This ratio was below normal in 13.2 per cent of the cases of neurosyphilis: 12.7 per cent of the cases of general paresis, 15.0 per cent of the cases of cerebrospinal syphilis with psychosis, and 16.6 per cent of the cases of tabes without psychosis.

And the ratio was above normal in 35.6 per cent of the cases of neurosyphilis: 35.8 per cent of the cases of general paresis, 30.0 per cent of the cases of cerebrospinal syphilis with psychosis, and 41.7 per cent of the cases of tabes without psychosis.

Therefore, in 48.8 per cent of the cases of untreated neurosyphilis there is definite evidence of some abnormality in the hemato-encephalic barrier to the passage of sugar.

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A CONTRIBUTION TO THE PSYCHOPATHOLOGY OF ALZHEIMER'S DISEASE.*

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Although there have been many publications dealing with the gross and histopathology of Alzheimer's disease, there has been comparatively little written concerning the psychopathology. This is usually due to the fact that most patients have undergone an advanced deterioration before admission, thus precluding any psychological study. Often patients are accessible and able to cooperate only for a relatively short period after the onset of the disease and psychological studies are possible only at this time. The pathologic studies, however, are made months and years later and are not truly representative of the condition of the brain at the time of the earlier psychological studies. For this reason it has been difficult to estimate the correlation between the amount of cortical involvement and the mental impairment. This case is of interest since it was possible to make a positive diagnosis while the patient was accessible to detailed psychological studies.

CASE HISTORY.

W. K., a white male of American ancestry, age 54 years.

Family History.—Father and mother died in advanced years and no mental symptoms noted. The patient has three elder siblings who are living and well.

Personal History.—Development normal and completed the eighth grade in school. During adult years was a syntonic, well-adjusted individual. Luetic infection at the age of 35 years with treatment. He worked as a skilled laborer and used alcoholic beverages moderately.

Present Disorder.—About five years prior to admission (at the age of 49 years) it was noted that he made errors in calculation. (The patient states that at a card party he was given the score cards for addition and, much to his surprise, he was unable to add correctly. This was the first difficulty that he had noted). After this he was unable to calculate without becoming confused and nervous and so he refused to attempt any calculation. His wife noted that he became clumsy in his movements, spilled things, bumped into furniture and continually dropped things. His work, however, remained satisfactory.

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Three years ago (51 years), due to the economic depression, he lost his job. He worried because he was unable to provide for his wife and had several outbursts of weeping. It was noted that he became less attentive and began "slipping fast." His memory became very poor and he would start to do something and forget what he had intended to do. When sent to the store he frequently started in the wrong direction and did not recognize his error. If sent for three articles, he invariably forgot at least one. At meals, instead of pouring cream in his coffee, he sometimes poured it into an empty plate and sometimes forgot to put sugar in his coffee. He often put sugar on potatoes instead of salt. He piled food on his plate before he had finished his previous serving. When corrected, he said he could not think.

About two and a half years ago the patient began complaining of severe occipital headaches which were generally relieved by aspirin. There was no vomiting associated with these headaches at any time.

It was then noted that the patient would tremble violently when startled and when anything unexpected happened "went all to pieces and didn't know which way to turn." Occasionally he was sent for wood and brought back a pail of water. In dressing, he was seen attempting to put on his night shirt over his overalls, putting on the wrong shoe, or trying to put on shoes over his bedroom slippers or underclothes over his trousers. He was unable to tie his necktie and merely threw it around his neck. He became increasingly careless about his appearance and had to be urged to wash.

In the fall of 1933 he worked as a common laborer on a relief project but his work was very unsatisfactory. He remarked that he was as likely to throw sand into the street as where it belonged. At this time he purchased an old automobile which he drove recklessly and without judgment and he often dashed in front of other cars without warning. During this period his wife noted a rapid loss of memory and, while he recognized people, he became confused on the days and months and often did not know his age. His wife remarked that, while he could not remember anything happening a few moments previously he easily recalled events of his childhood.

In the spring of 1934 the patient again complained of severe occipital headaches. His memory continued to fail rapidly. On one occasion he was sent to the corner for a newspaper but lost his way, and was later found walking up and down the street appearing quite bewildered. A short time later he feared that he was losing his mind and requested medical aid.

In the fall of 1934 he became increasingly helpless, had to be watched continually, was irritable and had temper outbursts. He realized that he was undergoing a mental change and feared that he might harm his wife. The patient realized that he was incompetent and avoided becoming involved in any complicated tasks. There were no delusions or hallucinations. He became more quiet and sat for long periods staring vacantly into space. When he attempted to speak he was often unable to complete his sentences and his enunciation was not always clear and distinct and he was aware of his inability to speak correctly. At times he mispronounced words, said them backward

and even coined new words. His sadness passed and he did not appear unhappy.

There has been no dizziness, fainting or disturbance of gait. The senses of smell and taste remained unaffected, but vision failed and he could not read for any length of time and auditory acuity was diminished. He complained that he was unable to write anything that he himself could read. He slept well and his appetite was excellent and his weight became greater than at any previous time.

Physical Examination.—The general appearance and physical state were in keeping with the stated age. He was short, stocky and powerfully built. The general body contour suggested a pyknic habitus and measurement confirmed this impression. The general muscular development was good and he was in excellent physical health. Blood pressure was 130/84, and there was no peripheral arteriosclerosis. Genitalia normal except for scar of previous initial lesion.

Neurological Examination.—Both pupils were irregular in outline, about 4 mm. in diameter, and the right was slightly larger. They reacted sluggishly to light and there was a small pupillary excursion. Normal reaction in accommodation. Extra-ocular movements normal except for slight nystagmoid jerk on lateral deviation. The patient complained of blurring of vision and headaches while reading and stated he had had diplopia on several occasions. There was presbyopia and moderate retinal arteriosclerosis. Hearing diminished in both ears due to slight bilateral nerve deafness, more marked on left. Facial movements normal. Peri-oral tremor when the patient attempted to talk. Tongue protruded in the mid-line. Slurring of speech on test phrases.

Reflexes of upper extremities were normal. Patellar and Achilles reflexes bilaterally hyperactive and equal. Bilateral Babinski and Chaddock. With Gordon and Oppenheim stimulation there was some fanning of the toes. No ankle clonus. Romberg sign negative. Gait normal. Senses of position, motion, deep pain and vibration were retained.

Superficial sensation was normal throughout. Abdominal reflexes absent; cremasteric diminished. Muscle tonus normal and no wasting.

General Psychiatric Examination.—On admission the patient was somewhat bewildered, but cooperative and accessible. There was definite affective dulling; he was not deeply concerned with his condition, accepting the whole matter rather philosophically. He complained of confusion, inability to concentrate, memory loss and headaches when he attempted to think. There was obvious difficulty in thinking and when attempting to answer simple questions, the facial expression was that of perplexity and intense concentration. He was conscious of his intellectual impairment and answered in a timid, hesitant manner as if expecting the answer to be wrong. When not being questioned, he stared straight ahead with a blank, vacant facial expression. He attended the examiner well but showed marked difficulty in comprehension.

The stream of thought was slow and halting and he often paused in the middle of the sentence. Occasionally he did not complete his sentence, but broke off abruptly and looked about in a troubled and perplexed fashion.

At times, there was a considerable latent period before responding, and there was a marked peri-oral tremor and opening and closing of the mouth as he attempted to formulate his answer. His responses were usually short, terse and unelaborated. It was necessary to bring out all facts by direct questioning since he volunteered no information. Content of thought was wholly concerned with his immediate situation. There were no delusions or hallucinatory experiences. He had good insight into his condition, but was unable to assign any cause, merely stating, "Something is wrong with my head." At times he became embarrassed because of his inability to think, but did not confabulate to cover up his difficulty. Instead, he frankly admitted his inability to give correct answers, stating, "I can't seem to get it through my head."

Memory for past events in his life was fairly well retained, but retentive memory showed a marked defect. Some school knowledge was retained, but he was unable to calculate. In general, intellectual ability showed considerable impairment. He was unable to give any detailed account of his illness, merely stating that during the last five years there had been increasing confusion and inability to think.

Laboratory Examinations.—Hemocytology normal. Blood Kahn test negative on three examinations. Cerebro-spinal fluid Kahn negative on four examinations. Lange's curve 0011100000 and on subsequent examination was completely negative. Mastic negative. Five cells in cerebro-spinal fluid. Total protein increased on several examinations (up to 57 mg./100 cc.). Permeability quotient of hemato-cephalic barrier (Walter's bromide method) 3.38. Urine examination negative.

X-Ray Studies.—Encephalography was performed under nitrous oxide anesthesia. 245 cc. of cerebro-spinal fluid were removed and replaced by 240 cc. of air. The lateral ventricles were moderately dilated and the third ventricle was increased in size. Basal cisterns not enlarged. The subarachnoid channels over the entire cerebrum were greatly dilated, the increase being equal on both sides. The subarachnoid channels along the sagittal fissure were also dilated. (Figs. 1 and 2). Diagnosis: generalized brain atrophy.

Further X-ray studies of the head were made four days following encephalography. Considerable air was retained in the ventricular and subarachnoid systems, the amount of air being excessive in view of the time elapsing since encephalography .

Biopsy.—Brain biopsy was performed under local anesthesia, an opening being made over the posterior part of the second right frontal convolution. The subarachnoid space was enlarged, the leptomeninges thickened, the sulci widened and the convolutions narrow and atrophic. Two brain plugs and two small pieces of cortex were removed from the posterior portion of the second right frontal convolution.

Histopathology.—(Brain biopsy.) In Nissl sections (Fig. 3) the leptomeninges were moderately thickened and fibrotic and contained numerous polyblasts. The cyto-architecture showed some rarefaction, especially in the second and third layers. There was moderate but distinct falling-out of

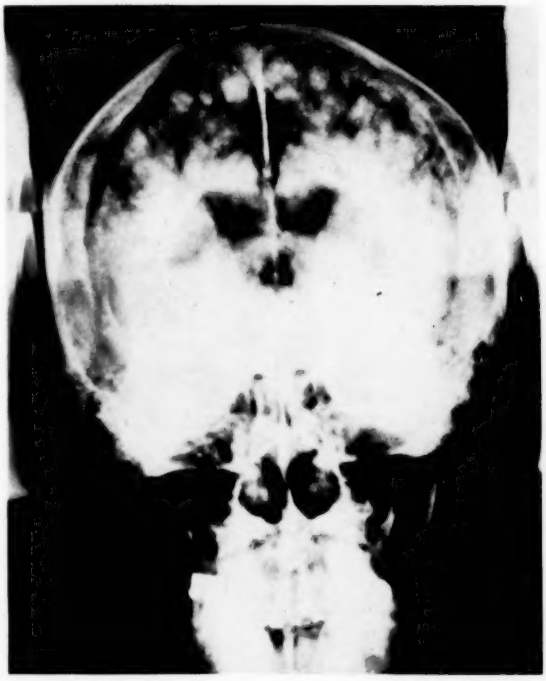

FIG. 1.—Antero-Posterior Encephalogram.

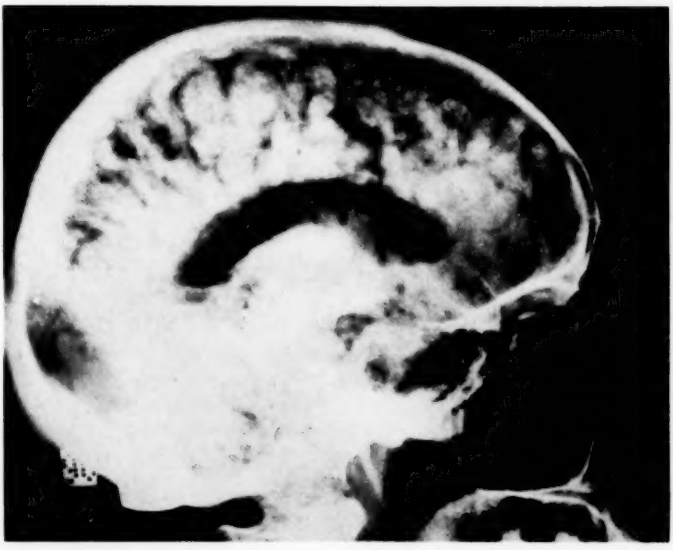

FIG. 2.—Lateral View.

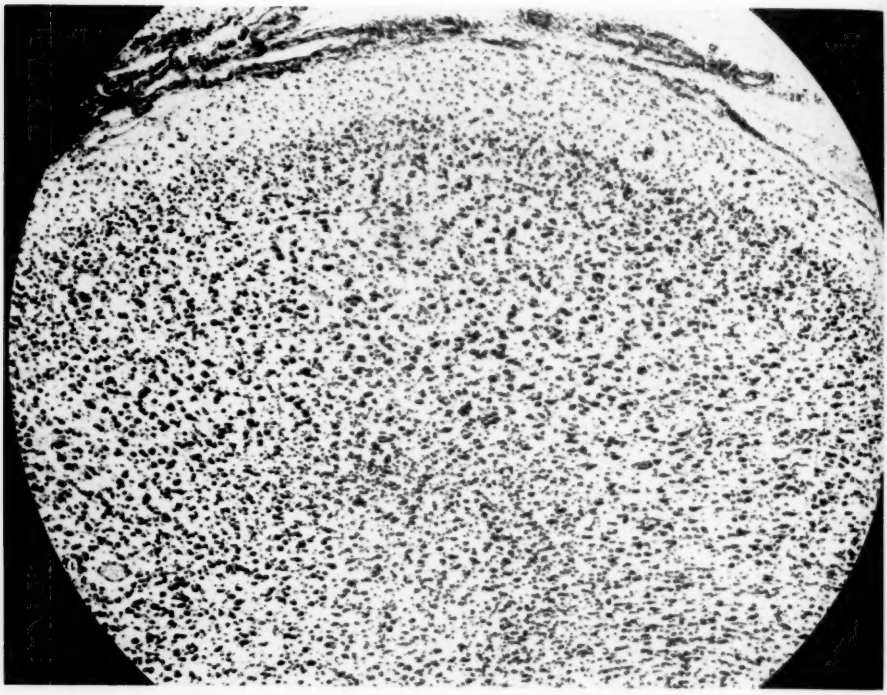

FIG. 3.—Nissl Stain. Ganglion Cell Changes and Moderate Falling-Out. Zeiss-Planar 20 mm.

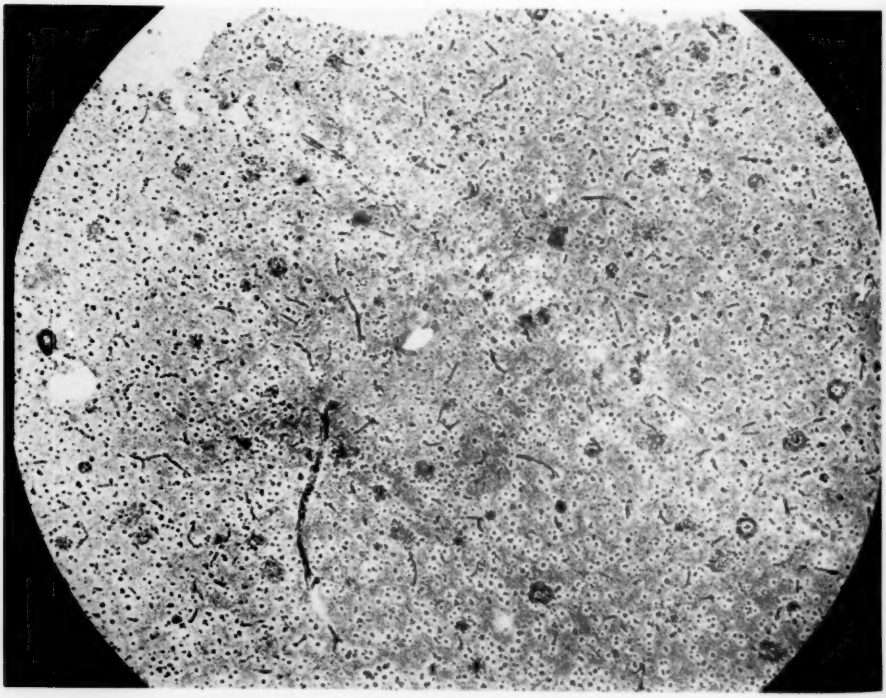

FIG. 4.—Braunmühl Stain for Senile Plaques. Zeiss-Planar 20 mm.

ganglion cells. Those remaining were either swollen and had a light, granular cytoplasm or the whole cell was shrunken and pyknotic. Very few normal ganglion cells remained. The glia response was moderate, being limited to proliferation of microglia.

Large numbers of senile plaques and Alzheimer fiber changes in the neurones were apparent in Braunmühl sections. (Fig. 4.) No changes due to cerebral arteriosclerosis or lues were noted.

Diagnosis.—Alzheimer's disease.

Psychological Examinations.

Memory.—Memory for remote events was well retained. Those events that were outstanding and had an emotional coloring were the most easily and correctly recalled. At times there was difficulty in immediate recall but after a few moments thought he was able to answer correctly.

School Knowledge.—He was able to recite the alphabet and name the days of the week, months and seasons. When asked to name five western states, he rapidly and correctly named eight. He was able to give four large cities and the main rivers of the United States. He recalled all wars in which this country had been engaged, with the exception of the Mexican War, but had no idea of their date except, "It was a long time ago." The recent presidents of the United States, the first president and the president during the Civil War were correctly recalled. The countries of Europe were recalled as follows: France, Belgium, Italy,* Sweden, Holland,* Asia, Africa, Iceland, Denmark,* Japan, Norway, Hungary, Slavish, Germany,* Switzerland, England,* Scotland, Wales.

He had a rough idea of the government of foreign countries but was unable to give any details. In the majority of cases he was able to give the location of foreign cities, countries and continents and to tell in what geographical category they should be classified. He roughly identified Bonaparte, Caesar, Longfellow and Dickens.

Retentive Memory.—The greatest disability was found to be in the field of retentive memory and the recall of recent events. The patient appreciated his short span of memory and became annoyed when he found himself unable to remember, complaining, "It got away" or "I couldn't keep that one." He attended the examiner well and made every effort to cooperate.

Memory for Individual Digits Read to Him.—The patient was tested for the immediate recall of 10 series of digits read to him. At a later date the same series was re-read and the return made after 30 seconds. On another occasion he was given the same series and return was made after two minutes.

He was able to return two digits immediately, after 30 seconds, and two minutes, with only one transposition in 10 trials. In 10 series he was able to return three digits immediately and after 30 seconds. However, in attempting to retain three digits for two minutes, his response was incorrect

* Capital recalled.

in six of ten attempts. The mistakes were often a transposition of correct digits but he occasionally returned incorrect digits. The errors of transposition were probably due to the fact that the patient remembered the numbers by repeating them to himself over and over and thus was able to return the correct digits but in the wrong order.

His performance became very poor on four digit series. He was able on immediate recall to return seven of 10 four digit series but after 30 seconds was able to retain only three series, the remainder being badly transposed, incorrectly retained or completely forgotten. After two minutes he was able to respond correctly only twice in 10 attempts, usually returning only the first or last three digits in transposed order.

He was unable to return five digits even on immediate recall. After 30 seconds or two minutes the response bore little resemblance to the original test series and he usually returned only four digits. With six digit series the patient was often unable to answer at all, stating that he could not recall a single digit. Most of the responses were four digits in length, but occasionally he added a fifth digit quite lamely and without conviction, apparently embarrassed by his failure.

Memory for Individual Digits. Patient Reading.—The patient was shown series of digits at the rate of one digit per second. He recalled two digits immediately, after 30 seconds and two minutes, making only occasional mistakes in confusing 6 and 9. He returned three digits immediately but made occasional mistakes after 30 seconds (two mistakes in 10 trials). After two minutes the memory defect was pronounced and he made many errors, often returning four digits instead of three, transposing the order and responding with incorrect digits.

With four digit series he made many mistakes, even on immediate recall, responding correctly in seven of 20 attempts. Often he returned three of the digits correctly, apparently not realizing he had read four. After 30 seconds he responded correctly in only three of 10 trials, forgetting whole series, or returning transposed or incorrect digits. After two minutes the series were badly garbled and none were returned correctly. He usually responded with three digits.

The patient was unable to return five digits even on immediate recall. He either responded with four digits which bore little resemblance to the original number or forgot the series completely.

Comment.

The digital memory span was about equal for auditory and visual stimuli. In both tests he was able to recall two digits for two minutes or three digits for 30 seconds, but failed to retain three digits for two minutes.

Two factors influenced the patient's performance:

(1) The number of mistakes varied directly with the length of time the series had to be retained. This was best shown in the three digit series where he responded correctly on immediate recall, made a few errors after 30 seconds, but after two minutes the majority of the responses were incorrect.

(2) The complexity of the material to be remembered influenced his performance greatly. With the three digit series the mistakes were rather simple, usually in the nature of a single incorrect digit or simple transposition of correct digits. In the five and six digit series there were many incorrect digits and the series was either badly distorted or completely forgotten. The patient remarked, "If you get too many it seems as though I can't keep any."

In the two digit series the patient recognized that he was dealing with two digits even after two minutes. With the three digit series he was able to recognize after 30 seconds that he was dealing with three numbers, but after two minutes often returned four digits. In the four digit series he apparently believed he was dealing with only three numbers, and in the five and six digit series he regularly returned only four.

The elements of perception and comprehension enter into the picture to some extent, the patient stating, "Sometimes it gets away from me and other times I can't get it through my head." However, the fact that he recalled three digits immediately and was unable to do it after two minutes proves that the main difficulty was in retentive memory.

Memory for Individual Letters.—(Normal performance usually six letters.) The patient was told and later allowed to read series of individual letters varying in number and asked to respond either immediately, after 30 seconds or two minutes. The test showed exactly the same results as the test for digital memory. He was able to return three letters on immediate recall but after 30 seconds he transposed and returned incorrect letters. Often he confused letters with the sound association and "B" was confused with "G," "D," "V," and "T"; "Y" with "I"; and "M" with "N," probably due to the fact that he remembered by repeating the series over and over. That this was not due to the examiner's pronunciation is shown by the fact that he responded correctly on immediate recall.

Memory for Individual Words.—(Normal performance usually five words.) The patient was read a group of five individual words and asked to reproduce this series immediately. At a later date the patient read the words and attempted to recall them. The performance was the same for both methods. On only one occasion was he able to return three words, the usual response being two. On several occasions he was unable to recall a single word.

Memory for Connected Words (Ranschburg).—The patient read, or was told, a pair of related words such as "button-pin" or "bird-feather." He was given from two to five pairs at a time and then asked to furnish the associated (second) word when the first word was supplied. When given one pair he responded correctly and with two pairs he usually returned one or both of the associated words. With three pairs he usually recalled one word, but with four or five pairs was usually unable to recall a single associated word.

This again demonstrated the effect of complexity of the stimulus on the memory performance. A simple stimulus was retained, but a more complex stimulus was forgotten in its entirety. In attempting to remember too much, the patient was unable to remember anything.

Memory for Sentences.—(Normal performance usually 12 words.) The patient was told, or allowed to read, connected sentences and asked to repeat them. He was able to recall a sentence of eleven words, only occasionally forgetting an adjective which did not change the meaning of the sentence. Retentive memory was much better when the subject matter was held together by a central theme or action than when the test material was made up of abstract, individual parts. Even when he was unable to repeat the more complicated sentences, he was able to grasp the main ideas and make an abbreviated answer in his own words.

Repetition of Stories.—After reading or hearing such stories as the "Shark Story," "Cowboy Story," etc., the patient attempted to reproduce them. He was able to return the action and theme of the story quite faithfully but would omit, and not recall on questioning, the finer details of description. The action, coherency and emotional coloring of the story apparently was of considerable aid in the recall.

The patient was taught one of the stories by constant repetition (in one sitting) and then asked to recall it one and four days later. He was able to remember the full action and many of the details at these times, showing that he could still recall things carefully taught to him.

Attention.

The patient appeared to attend the examiner closely. During test periods he devoted his entire attention to the problem at hand and apparently was able to exclude noises and other environmental stimuli. There appeared to be little fluctuation of attention.

Attention was tested by reading long series of letters and digits to the patient and instructing him to tap whenever a certain digit or number was read. He performed very well when these occurred at widely separated intervals. However, when they occurred close together, he had difficulty in tapping rapidly enough and jerked his hand back and forth, ineffectually attempting to tap and would finally say, "I missed one there." He explained his difficulty saying, "I ain't got used to working yet. My hand don't seem to work fast enough. My mind seems clear enough and I get it right away, but my hand don't seem to keep up." Other tapping tests showed that the attention was well maintained.

Perception.

There was a marked difference in the perception of abstract and common objects.

Perception of abstract forms shown by tachistoscope was definitely faulty. The patient was shown a series of cards bearing black dots which varied in size, spacing and number. The card was exposed about 0.5 seconds and the patient attempted to reproduce what he had seen. His performance was limited to a very rough guess of the number of dots but with almost no perception of the size or spatial relations. Series of colored geometrical

figures were not perceived after many trials and he was unable to make any effort to reproduce either the figures or their color.

Perception of common objects was tested in the following manner: Pictures of common objects such as shoes, hats, carpets, etc. were mounted on cards. There were five pictures of each type, each picture differing only a little from others of its group. The patient was shown one picture 0.5 seconds and the card then mixed with the other four pictures which resembled it closely and asked to select the card shown. The test was repeated many times with eight sets of cards and the patient was able to choose the correct card in every case.

The Ebbinghaus test, consisting of a paragraph with several words omitted, was also used. The patient read the paragraph several times and then attempted to fill in the words to complete the meaning. The test is judged on whether the whole paragraph is complete and sensible and not on the completion of individual sentences. The patient required a long time to complete the paragraph. He did not perceive his omissions and inconsistencies and was satisfied that his performance was complete and correct. He was unable to fill in any words in the more difficult tests of this type.

The correct words are given in parentheses and the patient's performance capitalized.

Once upon a time a donkey heard a (grasshopper) *BIRD* chirruping in the (grass) *GRASS*. Ah, he said to himself, if I could (sing) *LIVE* like that, how (happy) *HAPY* I should be. So he bowed low to the (grasshopper) *BIRD* and said, kind friend, what (food) ——— do you eat to make your (voice) ——— so sweet? I (drink) *EAT* the evening dew, replied the (grasshopper) *BIRD*. The foolish (donkey) *BIRD* tried to live on the same kind of (food) ——— and died of (hunger) *OF IT*.

The patient performed very well on the Heilbronner test for determining ability to grasp the meaning of incomplete figures and pictures. He was able to grasp the meaning of partially completed pictures and predict the shape of the completed figure.

Association.

In the Kent-Rosanoff association tests the patient gave 90 normal, two doubtful, and five individual responses. In three instances he was unable to respond either on the first trial or when the stimulus word was given again at the close of the examination. The test was given again a week later and he attained practically the same score. He was able to give normal responses with stimulus words to which he had been unable to respond on the previous test. On the other hand, he was unable to give any answer to some stimulus words to which he had previously responded normally.

The association time was prolonged and it usually required 10-20 seconds for the patient to respond. Often he responded after many seconds by saying, "Nothing comes." It was necessary to give several words the second time at the close of the examination. The patient was questioned regarding the long association period but he denied that he was suppressing any immediate

associations and explained the time interval saying, "Nothing came to me." At times an added difficulty arose because he forgot the stimulus word before the association was completed. Many of the normal responses were common association words and had a high frequency value, the average being 11.1. Association, as determined by the Kent-Rosanoff test, was essentially normal except for a prolonged association time.

Speech.

The patient complained that he often had an idea or an answer to a question, but experienced difficulty in expressing it immediately. He maintained that he knew exactly what he desired to say, but had difficulty in adjusting and coordinating his vocal apparatus. "Sometimes I think of something, but for a minute I just can't get my tongue to work." It was noted that often when he attempted to answer there was a preliminary period of peri-oral tremor and opening and closing of the mouth. Often he started out by uttering "a-a-a" or "a-er-a" and there was a period of 5 to 10 seconds when he was unable to answer. This period could be increased by startling the patient by a quick, gruff query, or by demanding an immediate response. At these times, there was a very marked peri-oral tremor, and the mouth was rapidly opened and closed.

On test subjects the speech was slow and halting, the words individually spaced, and the sentence without inflection or rhythm. However, when discussing pleasant episodes of his life, speech was more rapid and there was more rhythm and connection.

In ordinary speech there was some slurring. This was pronounced on test phrases, and was particularly noted on "r." Slurring was more prone to occur when the patient was concentrating on some test problem and was not giving full attention to the correct pronunciation of words.

Reading Aloud.—The patient read without inflection or rhythm. The beginning, middle and end of the sentence had the same intonation. Each word was pronounced individually, without regard for its position, or the necessity of emphasis. There was no division into phrases or clauses and the sentence became a string of unevenly spaced, individual words. In spite of this he understood what he had read.

He often read incorrectly and substituted related words for the printed text without noting these errors. "Should" was often read for "could" and vice versa. "He passed along the road" was read "He passenger along the road." In spite of this misreading he was able to give the correct meaning of the sentence.

Aphasia.—The patient complained that he often wished to answer or to express an idea, but for a moment was unable to speak. However, it was impossible to demonstrate any marked aphasia with the Head aphasia tests and his general performance was satisfactory. Some of the results suggested a mild aphasic disorder, but the performance as a whole was more suggestive of a general intellectual deterioration with marked memory failure.

Handwriting.—Writing was performed very laboriously. In beginning to write, the patient held the pen just above the paper and made continuous jerky starts. After some time he would make an abrupt start, write a few letters, and then lift the pen and hover above the paper as if undecided as to the next move. On other occasions he put the pen to the paper and made many little scrawls before he could form the initial letter. At times he could not start until he had pronounced aloud the initial letter of the word. Occasionally he formed the wrong initial letter and without perception of his error, continued to write the rest of the word correctly. For "yellow" he wrote "wellow." In writing individual words, he correctly dotted "i" and crossed "t" but often failed to do this when copying or writing out an answer. He occasionally put a cross bar through "d."

He was unable to locate and correct his mistakes. For example, when copying "The man and the cat" he wrote "The man d the cat." While writing, he spelled aloud, and it was obvious that he believed the "an" of "man" also to be the "an" of "and." He was unable to find the error when informed the sentence was incorrect. At times he realized that his writing was incorrect and he would check each word, spelling aloud correctly, yet failing to correct the writing.

In contrast to his previous handwriting his letters were large, clumsy and poorly formed. The patient's handwriting in 1917 (Fig. 5) may be compared with the same text in his present handwriting. (Fig. 6). Definite ataxia was not regularly present although tremor was occasionally noted.

The patient attempted to write the following passage from dictation:

"A female polar bear with two cubs was pursued by sailors over an ice field. She urged her cubs forward by running before them, and as it were, begging them to come on. At last, in dread of their capture she pushed, then carried and pitched each before her, until they actually escaped."

It was necessary to dictate very slowly and repeat each part several times. Many simple words were misspelled and there was no punctuation nor capitalization. (Fig. 7.) At a later date the patient was instructed to copy the printed text. He was allowed to consult the printed text as much as desired, but continued to misspell, failed to punctuate or capitalize, and several words were omitted. (Fig. 8.) There were several repetitions suggesting perseveration. As noted in previous tests, he was unable to recognize his mistakes and considered his copy to be correct.

Motor Performance.

Tests of motor ability were performed well. These consisted of various tapping tests, aiming and striking in definite rhythm with full arm swing at a small target, moving pegs from one pattern to another, pressing equally on two scales, and holding a stylus in a graduated series of holes.

The actual motor performance was very good. The only difficulty was in remembering the sequence or pattern to be followed. While the pattern directions were sometimes forgotten, the motor act was performed without difficulty.

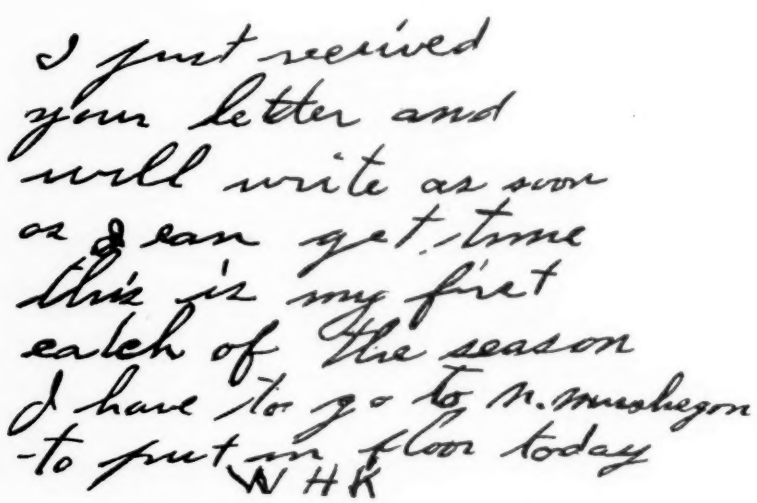
I just received
your letter and
will write as soon
as I can get time
this is my first
catch of the season
I have to go to N. Muskegon
-to put in floor today
W H K

FIG. 5.—Handwriting in 1917. Enlarged × 1.7.

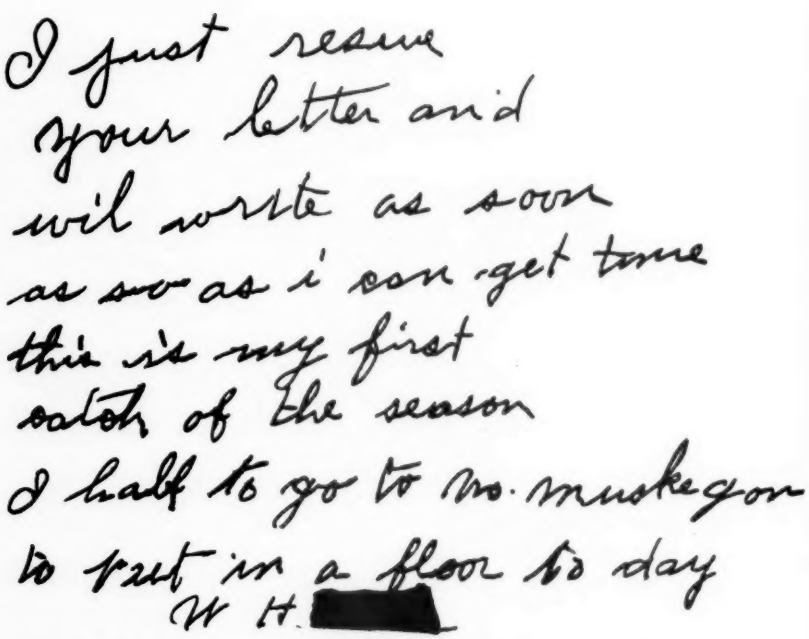
I just resive
your letter and
will write as soon
as soo as i can get time
this is my first
catch of the season
I half to go to No. Muskegon
to put in a floor to day
W H [redacted]

FIG. 6.—Same Text in Present Handwriting. Reduced × .23.

A feamel polar bear with ~~2~~ two cubs
was persued by sailors over an ice field
she urged forward by running befor them
as it wer beging them to run on
at last in dread of there captor she pusd
them carried and pitch each befor her
for ~~on~~ tal the escaped

FIG. 7.—Written from Dictation. Reduced × .66.

The polar Bar a female polar bear
With two cubs was pursued by sailors
over a icy field she urged her cubs
urged her cubs urged by running ahead
at last in dread of captur push them
carried and pitched befa until they safely
set actualy

FIG. 8.—Copied from Printed Text. Reduced × .66.

CALCULATIONS.

Multiplication Tables.—The multiplication tables presented a rather complex problem for the patient. It was not only necessary for him to solve the individual multiplication but also necessary to remember his place in the table. There were numerous omissions in the series, for as he attempted to multiply he forgot his place and omitted several numbers. After progressing a few numbers, he often forgot and had to return for a new start or ask "What was that last number?" On one occasion, when half way through a multiplication table, he forgot with which table he was dealing. When the examiner kept place for him the patient answered more easily. When the problems were written out by the examiner, the responses were more accurate and rapid. If allowed to concentrate all his attention on reaching the correct answer, the patient performed well. However, his general performance was poor when the attention was divided between several factors such as the place in the table and the correct answer. He made many errors which should have been apparent when the next multiplication was done correctly, yet he continued without any appreciation of his error: $7 \times 5 = 35$; $7 \times 6 = 54$; $7 \times 7 = 49$; $7 \times 8 = 56$.

At other times he made gross errors, yet apparently did not notice any discrepancy or inconsistency: $5 \times 10 = 50$; $5 \times 11 = 120$.

Problems in Multiplication.—The patient recognized the significance of the multiplication sign. However, he often did not notice the sign and performed addition in spite of the fact that on that day he had been calculating only by multiplication. He was able to multiply a two-digit number by a one-digit number as long as it was not necessary to "carry over" the decade digit. He had forgotten how to "carry over" and even when it was explained, he was unable to do it correctly. He could not solve problems involving a two-digit multiplicand and two-digit multiplier.

Division.—The patient could solve only those problems in division in which the quotient was a whole number, and in which both divisor and dividend could be found in the multiplication tables.

Addition.—He was able to add fairly correctly when dealing with only two numbers. More difficulty was encountered with three, and his solution was usually grossly inaccurate when he attempted to add four. He worked very slowly and constantly repeated his additions and was never sure of his result. One of the most regular errors was in forgetting to "carry" the decade digit from one column to the next. As he calculated aloud, it was possible to follow his errors. Often he added a column correctly but was unable to remember the decade digit which was to be "carried." While attempting to recall this, he would forget the sum of his column—and after re-adding the column—forgot that there was any decade digit to be "carried over." It was also observed that the patient must start at the beginning. When temporarily halted, he was unable to take up again the thread of his calculation, but instead returned again and again to the beginning of the whole calculation. The patient did not perceive his errors and often overlooked a whole column

or placed his answer in the wrong column. When told that his sum was not correct, he was unable to find and correct his mistakes.

Subtraction.—The patient was able to subtract only when all the digits of the subtrahend were smaller than the corresponding digits from which they were to be subtracted. He was unable to recall the mechanism of "borrowing" from the digit to the left, and was unable to understand it when it was carefully explained.

Summary.—The ability to add and multiply, although markedly impaired, was much better retained than subtraction and division.

General Intelligence.

Knowledge of Common Things.—The patient possessed a fair fund of general information which could be recalled without much difficulty. He was able to name a number of flowers, trees, precious stones, iron tools, brass objects, etc., and describe their appearance.

Ziehen Test for Discrimination and Comparison.—Two different animals, processes or things were named and the patient was asked to describe the similarities and differences between these. For example, the difference between a fly and butterfly, a horse and ox, or a tree and bush. The descriptive ability was poor. While he was able to give the essential differences in a rather stumbling and circumstantial manner he was unable to give clear-cut and decisive explanations.

Use of Collective Terms.—The patient was given a number of names of things and asked to supply the collective term that applied to all. For example, "What sort of animals would you call horses, cows, pigs and sheep?" Many various lists were used and the patient supplied the collective term without difficulty.

Word Building.—The letters E A I R L P were supplied and the patient told to construct as many words as possible, using each letter only once in each word. Approximately 50 common words can be constructed, but the patient was only able to form six words after 15 minutes effort.

Sentence Building.—Three or more associated words were supplied and the patient instructed to build a complete sentence using these words. This test gave considerable difficulty and he required a long time to complete each sentence. Often he was unable to use the original word and substituted a derivative, such as changing a noun to an adjective or verb. Usually there was little ingenuity displayed in the construction and the sentences were simple and unelaborated.

Example: 1.—Pipe, match, smoke.

"Pipe and matches are used in smoking."

It required 10 minutes to construct this sentence. On subsequent trials he was still unable to use the words in their original form. His best effort was, "The smoker uses a pipe and matches."

Completion Tests.—These tests involved perception of incomplete words and ability to spell. A list of 10 words, the initial letter of each word being omitted, was given to the patient and he was asked to supply an initial letter

that would make a complete word. He filled in nine of these correctly. Another list of 10, with the middle letter or letters omitted, was then attempted and the patient was able to complete seven. Words with double letters such as "dollar" and "letter" gave more difficulty than those with single letters. Nine of 10 words with the final letter missing were completed correctly. He was able to indicate that he understood the significance of the incomplete word even when he was unable to spell it. Thus "elbo—" was completed as "elbo*es*." A long period of time was required to complete this test.

Appreciation of Absurdity.—The patient was asked his opinion regarding a series of absurd statements. He usually was able to point out the absurdity and give logical reasons for his opinion. His failures were usually on those sentences that were long and involved.

Spelling.—The Kent-Rosanoff test was read to the patient and he attempted to write out the words. The majority of the words were spelled correctly. The list was then repeated and the patient spelled aloud. The vocal performance was very much better than the written and he was able to spell aloud most of the words he had written incorrectly. It appears that the added task of writing, and the division of the attention necessary for the formation of letters caused a marked disability in spelling. When he was allowed to give his undivided attention to spelling only, his performance was quite good. This was further borne out in some of his written compositions. "Were" was invariably written "wer" but he was able to spell it aloud correctly.

Porteus Maze.—The patient worked carefully and slowly and showed remarkable patience and persistence. On this scale he attained a mental age of 13 years, 6 months.

Stanford Binet-Simon.—On the Binet-Simon test he attained a mental age of 10 years, 10 months and an intelligence quotient of 63. His successes were scattered over a range of nine years.

Pintner-Patterson Performance Test.—The patient's performance on many tests was excellent and he earned the highest possible score in many of them. His score was reduced on five tests because of the time limit. The median mental age was 12 years.

Time of Mental Processes.

The time of mental processes was markedly prolonged and the patient required considerable time to complete tests. In previous tests, where performance time did not enter into the scoring, it was merely noted that he was very slow and deliberate.

The patient was given 50 playing cards and instructed to deal these as rapidly as possible. The normal time is from 10 to 15 seconds but he required 26 seconds. He was then instructed to deal the cards into two heaps according to their color, the test involving both discrimination and movement. The normal time for this performance is 17 to 25 seconds while the patient required 55 seconds. The patient was instructed to deal them according to suit.

The normal time is 20 to 35 seconds, the patient requiring 76 seconds. It will be noted that the time of discrimination is markedly increased.

The patient was given a form sheet bearing 200 letters, 25 of which were "A." He was instructed to cross out every "A" as rapidly as possible. The normal time is 35 to 60 seconds, 1.4 to 2.4 seconds being required for each letter. He was able to find 21 letters in 155 seconds, each letter requiring 7.3 seconds. On subsequent tests of the same type he was able to find 25 letters in 170 seconds (each letter 6.8 seconds) and 22 letters in 120 seconds (each letter 5.4 seconds). It is noteworthy that his performance improved with practice.

Mood and Behavior.

Although there were outbursts of irritability prior to admission, none were noted in the hospital. He remained quiet, cooperative, affable and agreeable. When discussing some interesting subject or phase of his life, his facial expression showed animation and vivacity. He laughed heartily at humorous ideas and occurrences and enjoyed jokes of his fellow patients. Most of the time, however, he sat quietly, staring vacantly into space, apparently quite oblivious of his environment.

No mood swings nor emotional instability were noted, but rather an apathy and dulling of emotions. However, on one occasion he became enraged following being photographed, and remonstrated with poorly restrained fury. When the matter was discussed with him, he was unable to maintain his rage, but instead burst into tears. A few moments later he was again his placid, dull self, with no trace of the previous affective storm. In general he was not especially concerned with his economic condition, his wife's financial difficulties, or his progressive intellectual failure. He was somewhat sad for a few moments following visits with his wife, but this soon passed and he again appeared contented with his situation. During test periods he occasionally became a little depressed or disgusted with himself because of his failure. These moods were maintained only for a few moments, and as soon as he returned to the ward he was again calm and placid.

The patient entered into ward activities but never was a leader nor made any suggestions. He preferred to sit quietly staring blankly ahead until someone invited him to play. There was a marked loss of initiative and he did nothing unless someone suggested it. Even though he enjoyed talking, he never began the conversation. He worked willingly about the ward when requested, but never started on his own initiative nor found work without assistance.

The patient exhibited marked confusion when he suddenly attempted some act. For example, after sitting quietly for some time, he would rise suddenly to go to his room. On arising, he would look about the ward with a dismayed, bewildered expression and turn about or even circle his chair once or twice before starting in the right direction. Often he went a few steps in the wrong direction and then stopped and looked about helplessly. The most marked reaction occurred when someone shouted at him. At these times he jumped from his chair, looked about with a startled, confused, terror-stricken facial

expression and marked peri-oral tremor, waved his hands about in the air, trembled violently, and attempted to run but was unable to take a step. His appearance and incoordinated motor reactions suggested panic.

SUMMARY.

There are several theories concerning the etiology of Alzheimer's disease. This is probably due to the fact that the disorder is really a syndrome with numerous etiological factors, and may be subdivided into the presenile type (hereditary transmission not known), the intermediary type (with hereditary trends), and the juvenile type (hereditary transmission not known). Two cases have been reported in association with lesions of the choroid plexus. (Fuller, Malamud-Lowenberg.) This case, in which the etiological factors are quite obscure, offers little assistance in arriving at the cause of the disease. Since the disorder began at the age of 49 years, it is difficult to regard it as an early senility. Hereditary factors can also be excluded since the ancestry is characterized by longevity and preservation of mental faculties in advanced years, and three elder siblings show no mental symptoms. There was no evidence of disturbance of the hemato-cephalic barrier, bromide permeability being within normal limits.

The onset was slow and insidious, the early symptoms being confined to the intellectual field as manifested by inability to calculate. The early affective changes were not marked and only mild anxious, apprehensive reactions were noted.

The duration of the disease is frequently short (two-three years) and the progress marked by rapid physical and mental failure. In a few cases the duration was 10 to 20 years. (Barrett, Bett, Grünthal.) This case belongs to the latter group as shown by the considerable intellectual preservation after five years.

Neurological disturbances have been observed frequently and the findings in this case are in accord with those reported in the literature. However, there are only a few reported instances of positive Babinski and Chaddock signs.

Disorders of speech are common in Alzheimer's disease and were marked in this case. There was mild slurring in ordinary conversation but pronounced on test phrases. There was no definite evidence of aphasia and much of his difficulty appeared due to inability to coordinate the vocal apparatus rapidly. The loss of

inflection, rhythm and emphasis in reading aloud was apparently in relation to the necessity of attacking each word separately. He focused his attention on the correct pronounciation and comprehension of the meaning and thus the grammatical relations of the words were overlooked.

The most interesting and important findings were in the intellectual fields and the accompanying functions of motor expression. The narrowing of the field of mental and motor coordination and the necessity of full concentration on a single function were well shown in tests of motor ability. In those tests in which all attention was focused on the actual motor function, the performance was excellent. When the attention was divided (as in tapping when a certain word was read, writing from text, written spelling) both mental and motor performance were poor. The motor coordination was poor unless all attention was centered upon it.

This case, because of its slow progress and the accessibility to examination, offers data on the type and progress of the mental disorganization. The first impairment was in the field of calculation and continued until there was marked difficulty in carrying through logical mathematical processes. The mathematical ability best retained (multiplication tables) was dependent on remote rote memory, while he was unable to solve problems requiring logical reasoning. Memory, also, was involved early in the disorder, but the main impairment was in the field of retentive memory while remote memory was fairly well retained. Various tests demonstrated that he attended, was able to perceive and comprehend, but there was severe disability in engram formation and recall. However, when the subject matter was deeply engraven (constant repetition of a story) it was retained and recalled after several days. The functions of perception and comprehension were fairly well retained as long as only simple everyday objects were used, but showed considerable impairment on unusual and abstract material. The slowness of mental reactions was well shown by many time tests as well as the prolonged association time. The correct result was achieved only after prolonged and laborious effort.

The extent to which some intellectual functions were retained is surprising in view of the advanced cerebral pathology suggested by encephalography and the histological picture. It has long been felt that there is a close parallel between the degree of mental de-

terioration and the severity of the pathological process. Recently Grünthal has clinically classified cases of Alzheimer's disease as mild, moderate and severe and compared the degree of mental impairment with the histological findings (number of plaques, Alzheimer fiber changes, lipoids, glia reaction, ganglion cell changes). In his series there was a very close correlation between the clinical and histopathological findings. This case would fall in a clinical transition group between Grünthal's mild and moderate types, yet the cerebral pathology, judging even from the very incomplete pathological study, would suggest a very severe involvement. It is apparent, therefore, that while there is great value in Grünthal's approach, this case does not fit into his classification and correlation.

This case is unique in that a positive diagnosis was made while the patient was still accessible to examination. An attempt was made to outline a pattern of mental deterioration in order to ascertain if there was a psychological picture pathognomonic of Alzheimer's disease which would serve to differentiate it from other organic reaction patterns. An evaluation of the findings in this case suggests that at present it is not possible to differentiate Alzheimer's disease from other diffuse diseases of the cortex solely on the psychological picture.

CONCLUSIONS.

1. In this case of Alzheimer's disease, the first symptoms were in the field of logical reasoning.

2. Loss of retentive memory was an early symptom and the retentive memory loss soon became out of proportion to the accompanying intellectual deterioration.

3. The early intellectual failure is more in the nature of a loss of coordinating functions and a narrowing of the ability to perform in several fields at one time.

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COMMENTS ON MENTAL HEALTH ADMINISTRATION.*

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It is only during the last half century that "public health," as it is known today, began to assume organized form. During that period, mortality rates have been reduced by half and life's expectancy has increased by two decades. The prevention of deaths from communicable diseases and the lessening of mortality in infancy have been largely responsible for these changes. Whereas health measures have been applied intensively to these two fields, other factors have contributed materially to these results. They bear indirectly and sometimes independently upon the application of public health measures.

With progress in the prevention of needless deaths, the attention of public health workers is being awakened to the basic fact that the health of communities depends not only upon the survival of the individual but also on the amount and character of sickness in a population. It is a fact that diseases most frequently resulting in death are not necessarily those causing the most illness and incapacity, and that death rates alone cannot be regarded as an index of the health and vitality of the people.

In other words, in the development of a modern health program, it is not deaths and longevity alone that should serve as health criteria, but the incidence and records of sickness must be taken into account also.

The significance of the need for broadening the scope and outlook of public health measures will be better appreciated when it is realized that the future and security of a nation depend a great deal on the health of its citizens. This cannot be left wholly to individual endeavor, since measures and policies must be adopted eventually for more closely integrating individual medical services with those concerned with the prevention of disease and ill health.

* Read at the ninety-second annual meeting of The American Psychiatric Association, St. Louis, Mo., May 4-8, 1936.

Viewing the so-called mental hygiene movement from the standpoint of its evolutionary growth, it has concerned itself with efforts for improving and more equally distributing those facilities necessary for the early recognition and treatment of the mentally ill; with the prevention of mental illness; and with the conservation and promotion of positive good mental health.

The promotion of positive health, however, is not concerned so much with the question of illness and its avoidance as it is with securing the greatest degree of health and efficiency for the individual. The promotion of positive health is dependent to a considerable extent on forces beyond the function of individual physicians, medical specialists or of public health agencies. Sociologists and statesmen in the broadest sense are more directly concerned. Their fundamental contributions to the field of positive health must be recognized but need not necessarily come within the scope of mental health administration.

Sociological problems involving density, movement, geographical and age distribution of populations; and involving also occupational groups including the active, non-active, unemployed, infirm and aged, all carry implications in the mental health conservation field. Social morbidity and mortality, heredity, occupational hazards, child and woman labor, night work, home work and overwork, and other occupational factors are sometimes directly or indirectly related to the problem of conserving the physical and mental health of a population. Good housing conditions and other domestic factors occupy an important rôle in the promotion of positive mental health, as do economic, sanitary and educational factors. Thus, sociology in its practical application may have significant contributions to make that indirectly serve the conservation of mental health in its broadest implications.

Moreover, legislative measures that have for their object the protection of individual rights, the promotion of the greatest good and security for the greatest number, and serve to promote human progress and happiness do much toward the protection of public health and the promotion of positive good mental health. It must be appreciated that legislative measures have many facets, some of which concern both directly and indirectly the field of preventive medicine. The legal and medical professions are in a position to contribute jointly to the field of mental health conservation.

Furthermore, if it is true that the conservation of mental health is partly a matter of training and habits, then it is apparent that the administrative responsibility of education in its broadest implication is of great importance. This statement carries greater significance when it is realized that education means far more than the acquisition of knowledge. Educators, including parents, should be concerned with the development of what is called normal habits, the term "normal" being used as indicating behavior bringing successful adaptation to social environments. Mental hygiene correlating its interests with those of educators is probably more concerned with avoiding and remedying abnormal habits. The interrelation between mental hygiene and education becomes at once apparent.

Distinction Between Prevention and Conservation.

For purposes of this discussion, an artificial distinction may be made between the prevention of ill health and the conservation or promotion of positive good health. It is evident that medicine has the larger accountability for the prevention of illness, since a knowledge of the nature and causes of illness is the foundation upon which preventive measures must rest. Modern preventive medicine, however, may exert beneficent influences for carrying out those measures and policies that have for their object the promotion of security and social progress and indirectly promote the health of a population.

A distinction between prevention and conservation can never be an absolute one. Thus, it is known that much of the behavior of man, including many symptoms of ill health, is a direct reaction to his social environment. It is also known that if remedial and preventive medicine are to undertake their full responsibilities, then it is essential that they take cognizance of the forces at work in the community. The study of such forces as they affect the mass or groups of the population is a function peculiar to epidemiology and sociology. Problems encountered by the demands being made in the practice of preventive medicine are increasingly seeking for their solution an absorption of the methods and technique of sociology. Sociology and epidemiological methods, in their broadest application, have some contributions to make toward a better understanding of the prevention of mental illness and the promo-

tion of positive good mental health. Further research studies appear necessary before evolving clear-cut and direct administrative responsibilities applicable primarily to the field of preventing mental illness. There is always danger, through the inspiration of workers that " mental hygiene " may wish to assume administrative responsibility for carrying into effect measures and policies that rightly belong in another field of endeavor having definite aims and objectives. The reason for such an assumption may be due to the fact that the accomplishment of these aims and objectives bears indirectly upon the promotion of positive mental health or its conservation. But this in itself is not a sufficient reason for mental hygiene assuming administrative responsibility for the activity in question.

The Responsibility of Medicine.

It would seem unnecessary to justify the accountability for mental health or mental hygiene as belonging in the field of the medical profession. One obvious reason for this statement is that the diagnosis and recognition of the nature and causes of mental ill health are the foundations upon which the whole superstructure of mental hygiene must be built. The prevention of ill health and the promotion of positive health imply a knowledge of ill health.

In many instances the exact nature of certain forms of mental illness is unknown; their exact cause is often vaguely understood; and definite knowledge as to where, when and under what conditions they occur, is far from complete. Nevertheless the exact nature of some of these diseases and disorders is known, and their causes, conditions under which they arise, and their treatment, amelioration and prevention are fairly well understood. General paralysis of the insane, or syphilitic meningo-encephalitis is one example of the latter situation.

The evolution of our present knowledge of this one disease represents a romantic history of a little more than a century and a quarter's observation and study. The amount of work and study necessary to bring the knowledge of this and other mental diseases to their present state represents diligent application and study by a widely diversified professional group, based upon a background of scientific inquiry and traditional attack under the banner of medicine. Measures for the control and prevention of syphilis are prac-

tical avenues for the prevention of syphilitic meningo-encephalitis and the administrative responsibility for accomplishing this purpose lies with those concerned with the suppression and control of venereal diseases.

A Challenge.

If on the other hand, one believes that the attitude, the behavior and the conduct of an individual and the adjustment of his body to his environment are all intricately bound up with that complicated maze of neurological function which associates, correlates and synchronizes the various activities of the organs of the body and of the conscious mental life, then psychobiology and mental health must enter into every aspect of human activity. Such a broad conception of mental hygiene, or mental health, at once becomes a challenge for all those interests and activities embraced by the fields of human relationships.

A determination of the more exact nature and causes of mental diseases is a special challenge to medicine and biology; whereas the prevention of mental illness and the conservation of mental health are not only a special challenge to medicine and biology, but are also a particular challenge to statesmanship and the legal profession, and to sociology and education in their broader aspects.

Research.

It is apparent that a comprehensive mental health program must take into account the need for research and investigation into the nature and causes of mental ill health, and a more accurate determination of where, when and under what conditions such diseases arise. The United States Public Health Service, because of its access to clinical material, being charged in law with the care and treatment of a widely diversified group of beneficiaries or wards of the government, and because of its wide scope of interests and activities in the field of biologic research, is potentially fitted as a nuclear agency for carrying on studies of this character. There is nothing new in such a proposal, since whole time research supported by public funds and embodying careers for properly qualified personnel is already effective.

It is apparent that some agency must eventually correlate and evaluate research projects being undertaken in this particular field,

in order that those engaged therein may be in a better position to concentrate their efforts in directions best suited to accomplish results. A national health agency may justifiably assume, not only the conduct of research studies in the field of mental health as they relate to the application of preventive measures, but it may serve also as a depository for the collection and dissemination of information on various research projects undertaken by other agencies; and to stimulate such agencies for research in this particular field through its correlating and coordinating efforts.

Integration with Health Agencies.

The time has also arrived when more concerted measures must be adopted that seek to uproot the community sources of mental invalidism, disease and defect. Preventive medicine must know where, when and under what conditions such disorders arise. It must, through an epidemiological approach, modified to meet these peculiar needs, study those sociological and environmental factors instrumental or contributory in this cause. By such a fact-finding method it may be possible to integrate the present knowledge of mental hygiene into a regularly constituted local health organization.

Those mental disorders involving exogenous poisons and infections are mass phenomena of disease demanding mass control and the application of preventive measures embracing those broad public health policies of which mental hygiene is but a part. Those mental hygiene situations involving alcohol, drugs, industrial hazards, venereal diseases, infections of the central nervous system primarily, nutritional problems, and child and maternal health all carry with them mental health factors that must be met eventually through the regularly constituted health agency amplified in its organization and outlook to meet these special health factors.

The mental health interests of a regularly constituted local health agency lead to inquiries correlated with those of education methods and with measures for the correction of adverse situations in that particular field, with those of jurisprudence and with those of a sociological and epidemiological character which bear upon the prevention of mental illness and upon the promotion of positive mental health.

Training of Personnel.

It is evident also that the present cooperative endeavors for arranging a medical curriculum to meet eventual needs must be maintained between those interested in problems affecting the health of the general public on the one hand, and those who are concerned with medical education on the other hand. Similar endeavors are essential in relation to the curricula for the training of technical and other personnel whose tasks and interests relate to public and mental health.

Agencies interested in mental health should give endorsement to that immediate problem of the American Board of Psychiatry and Neurology concerned with the establishment of minimum standards for qualifying specialists in these fields, so that the general public and other groups, such as those requiring trained personnel, may possess guides for choosing specially trained people for those spe cial tasks involved in a comprehensive mental health program.

Avenues of Approach.

The " mental hygiene movement," appears to have reached that stage in its development when it is desirable to re-survey its fundamental values and also the security of the foundations upon which it rests. Such a survey may be approached through six broad avenues of interest: First, that concerned with the recognition and with the early and adequate treatment of the mentally ill; second, with investigations into the nature and underlying causes of such illness; third, with the training of personnel for undertaking the duties involved in this particular field; fourth, with the adoption of measures to render less threatening a possible increase in the number of the mentally ill; fifth, with a more satisfactory solution of the economic problems associated with mental illness; and, sixth, with measures for uprooting community sources of mental invalidism, disease and defect.

Problems of Adequate Treatment for the Mentally Ill.

There is no denying that a wider interest is now being shown by the lay public in disorders of the mind. Failures, unconventional behavior and conduct are being interpreted, not in terms of institutional provisions, but in terms of personality factors having

behind them mental implications. Workers in this field are being called upon for more and more consultant advisory services in the community. Home, school and other relationship problems are being referred; demands are being made by educational and health services; by industry; by general hospitals; vocational and child guidance agencies; by courts and penal and correctional institutions, and those ministering to dependency and other social problems, for services that demand an organized and concerted public policy to meet the needs of the mentally ill.

On the other hand, the demand for these advisory and consultant services is far greater than can be met with the facilities and means that are now available. Rapid growths in population, coupled with the necessity for securing immediate institutional provisions for those making the strongest appeal, have resulted in the development of piece-meal facilities and policies, without regard to an adequately balanced program to meet the needs. Such piece-meal growths, however, have met some of the community's needs and left other and perhaps equally important needs, unprovided for.

The recognition, treatment and care of mental illness implies a knowledge of these diseases; and whereas the present status of medical knowledge makes possible the interpretations of departures in social adaptations and adjustments, not in terms of institutional facilities alone, but in terms of individual needs and requirements; nevertheless that knowledge does not always enter into the formulation or administration of public policies toward the mentally ill of American communities.

In fact, in the majority of instances where central administrative control agencies have been established the executive and planning functions have been assumed largely by lay representatives, without regard for the executive and administrative functions which modern medicine may or can assume.

It is apparent that no community, state or local jurisdiction has kept pace with the needs of the mentally ill; nevertheless, in those jurisdictions where this administrative task is directed and planned by medically trained persons, the facilities and public policies concerned with the problem are more nearly approaching a solution than in those jurisdictions where domiciliary facilities alone represent the assumed total of a community's obligation and responsibility.

Medical leadership is necessary for bringing about those changes that are demanding a better solution of the problem of mental illness. Such leadership must formulate and execute better balanced programs to the end that mental illness may obtain early recognition and adequate forms of treatment. This leadership, however, must be coupled and coordinated with the highest order of statesmanship so necessary and essential for a forward march in human progress.

The time has arrived when a national health agency must take cognizance of the need for greater uniformity in this field. It is evident that an agency like the United States Public Health Service must eventually assume a more permanent and active rôle in this particular field by serving as a depository for the collection and dissemination of information on matters pertaining to mental health administration; by making studies and investigations of the prevalence and needs of the mentally ill; and by making available to the states and political subdivisions thereof a consultant service, to the end that more nearly adequate and equally distributed facilities may be provided and that more uniform measures and public policies may be adopted for the early recognition and treatment of mental ill health.

Mental health administration in the United States stands at a crossroad. It occupies the same relative position today that public health administration occupied 80 years ago. Its fundamental need at the present time involves the development in all state governments of a department, a division or a special agency for the effectual fulfilment of the needs of the mentally ill of the general population and the appointment of a competent, reliable and experienced physician as its director with executive responsibility and such deputies and assistants as may be required for the responsible execution of the modern medical aims and objectives which the problem of mental illness requires for its solution or amelioration.

DISCUSSION.

THOMAS K. GRUBER, M. D. (Eloise, Mich.).—The assayist is to be complimented on his thorough grasp of the subject under discussion.

The set-up outlined should be in many ways a very fine one, viz., that of placing the care of, responsibility for and treatment of, mental disease under the great Father, the Federal Government. It must be admitted that mental

illness of institutional degree was socialized many years ago. This socialization just had to be carried out because of economic necessity; bearing in mind that the mentally ill did not become deindustrialized over night, but were getting at their state of mental ill health over a long period during which any financial competency was used up; bearing in mind farther that while an individual is ill and institutionalized he is not earning.

The entire care of illness of whatever nature must always remain in the hands of the regularly educated and licensed physicians. Just as soon as the entire care of illness begins to be socialized personal initiative must suffer. The number of physicians in the private practice of psychiatry is rapidly increasing and no encouragement should be shown to any set-up that would discourage them. There are too many laudable clinics in existence already; too many places for people to go and get drugstore or curbstone advice. What is needed is a large number of clinics to which people can be referred, in which the person will be advised to see his or her family doctor, his or her family psychiatrist.

The "mental hygiene movement" is all right just where it is and is doing an admirable piece of work in assisting the psychiatrist to carry on his work; in helping to create public sentiment for proper education of what this same public needs and wants. It does not need to be taken over by any political bureau.

The facilities of the Public Health Service could and should be used in gathering information and statistics, as to the cause and incidence of mental disease.

Birth control, human sterilization, are entirely too "hot" subjects for this or any other medical organization to advocate at present. Agreement must be had with the essayist that a proper measuring stick must be devised before anything positive can be postulated on such highly controversial subjects.

Since the individual members of *genus homo* are highly individual, since communities are highly individual, can it be possible to organize and regiment this problem into solution?

The Public Health Service should never presume to assume responsibility for mental health. The Public Health Service should encourage better teaching of the fundamentals of the psyche and psychopathology. It can be a great adjunct to the private practitioner and to institutional management as well. It should stay out of the treatment field in mental disease, and should get out of the treatment field in all other types of medicine and surgical care.

The Public Health Service had always done a beautiful work in prevention of disease and can and will, we feel, assume its place in preventative psychiatry (if such a term may be allowed).

DR. CLARENCE O. CHENEY (New York, N. Y.).—These important problems that have been presented by Dr. Treadway may be discussed possibly from varied points of view. The question is, whether mental health promotion, efforts towards mental health, prevention of mental disorder, shall be

controlled more through central bureaus, whether there shall be centralization; or whether there shall be, on the other hand, in quite the opposite direction more and more of a turning over of these individual mental health problems to the private physician. Those are two entirely separate conceptions, although as Dr. Gruber says, perhaps they might be joined if it were accepted that the Public Health Service has the function of information and education regarding health while the physician has the function of treating disorder and disease.

DR. ADOLF MEYER (Baltimore, Md.).—Mr. Chairman, I am keenly interested in seeing this development come from sources from which for a long time there seemed to be relatively little attention given to mental disease. Whether it was because of any fear of bureaucracy or appearance of producing bureaucracy or not, I think there were other factors, especially the aversion of medicine and all natural science to dealing with the person and things mental.

The problem of mental hygiene is one of those things which might be called excedingly diffuse and of value only when [they are] adequately diffused. But it also has to have its reverberation and its reverberators in the positions of greatest vantage or of influence. It is an unfortunate thing that we in the medical profession have got off on the wrong foot in the discussion, to my mind, discussing first supposed dangers and invasions before we have discussed what we are trying to do and how it is being done.

As I see the Public Health Service, it is one that has the tremendous task of being *an example,* but not a boss, of medical work in this country. It certainly does not aim to do and it cannot do *the work* for the country; but it does work *for* the country and it sets a pace primarily within the field of its obligations. There are in the Public Health Service units which really are not attended to by any of the general profession and, therefore, form an obligation; take the Marine Hospital Service, take the Veterans Service, take quite a number of the services that are very definitely thrust upon the central authorities, not with the idea that they shall be made the owners or proprietors of particular things, but that they shall do their duty.

At the twenty-fifth anniversary of the mental hygiene movement, I felt obliged to point to two great difficulties that one meets in mental hygiene and that the movement as such has to face. On the one hand, it is the tradition of the division of labor and there, of course, we have the clergy, we have the educators, and then we have those who ought to do everything for the sick but do not do it because they have not given the proper help so far to initiate it in their own ranks. I mean by that the medical profession as it was educated 30 years ago and as it, to quite an extent, is still adversely influenced. The other danger is science, which does not want to broaden out and give a place to things which can be properly handled only by people who are willing to take into account wide enough relations, not as puzzles, not as things too difficult, but as things requiring a certain experience and a certain methodology without the old fear of encroaching upon the field owned by others.

Now I think things have changed very largely and I had an opportunity three or four weeks ago to hear representative teachers of psychiatry from 37 medical schools discuss what is the present-day intention of undergraduate general medical training in the direction of mental problems.

Dr. Gruber mentioned the fact that there were too many clinics. Well, I think there are too many necessities for clinics. As soon as enough practitioners are adequately trained for coordinated work, the clinics will take on an aspect quite different and there will be a distribution of that domain of work quite different from what it is at present. If the work is not done generally and it is all dumped on a few who are willing to serve in clinics, then we are dealing with an anomaly; but it is not such a dangerous thing as soon as the medical profession and the leaders begin to cooperate in a distribution of the work and of opportunities that only need better orientation. Who is better qualified to furnish an example than those bodies that we organize, not, as so many seem to think, in what may still be a miscarriage of democracy where we systematically suspect government? We may have cause sometimes, but we have to cooperate with government and government cannot be anything effective except when it works by example of orientation. I think the Public Health Service has done remarkable things in that way, in the investigations and science and also in practical work. Let us forget the idea of one's having to face a bureaucracy. That ought not to exist, to my mind. Or if it has cause to develop, the cause ought to be removed. Let us have *samples*, and such a sample I see in the Veterans Service; such a sample I see in the Marine Hospital Service. What is it to do? It is to encourage physicians, as Dr. Treadway has encouraged them to do, to use methods which will do good in the hands of those who have the job, the Marine Hospital or whatever it is. Those who are not involved in that job but do the general public health job as practitioners, and those who give the general stamp to the philosophy of science and government, they all should again work as samples. Every physician has to be a sample that teaches the professor of psychiatry to teach the psychiatry that is needed and wanted. The scientist, too, has to give different perspectives so that he furnishes the type of demonstrations that include a mastery of the mental facts of man that have scientific and practical value. By working together, we will get somewhere.

I wish many of you could have heard the deliberations and discussions of those concerned with psychiatry at the present time. Most of the work that has to be done is not psychiatry at all; it is cleaning up with simple common-sense what should be done by every general practitioner and those who have taught him; we ought not to have any cleaning up service. The younger men who are now getting their training in a common-sense handling of the person as well as the "disease" will, I think, leave very little to be cleaned up, because they get an understanding that there is anatomy and physiology and person function and that the person function requires the attention of every practitioner, no matter in what form, in what combination it occurs. If the amalgamation of the work with the parts and the person of the patient

can find good examples, that will be all that the clinics and the hospitals that have government connection will want to do and can do; and then let us encourage everybody to do the same—as general practitioners, as state institutions, as government institutions; there has got to be a working together of all of these agencies, side by side, and it can be done without friction.

DR. C. M. HINCKS (Toronto, Canada).—During the depression, unquestionably those states possessing a mental hygiene commission, or its equivalent, fared better, for the most part in meeting the demands for hospital accommodation, clinics and the supervision of paroled patients than states lacking such an administrative facility. Long term planning, that is so necessary in this field, and the securing of state appropriations require the day-in and day-out work of a commission. There is no valid reason why such an administrative set-up should in any way curtail the initiative and usefulness of the private practitioner.

Dr. Treadway has referred to the possible eventual contribution of the United States Public Health Service in forwarding mental health progress. We are all appreciative of the fine work in mental hygiene that is now being done by the Service under Dr. Treadway's very capable direction. I, for one, hope that the United States Public Health Service will extend its activities in directions that have been outlined in this splendid, comprehensive paper. I am not at all afraid of bureaucracy or domination from Washington. I feel that the United States Public Health Service is a fitting organization to act as a depository of knowledge, and to contribute to research work, particularly in the field of epidemiology.

I would like to see the United States Public Health Service put on a much more permanent and stable basis some of the pioneer activities that have engaged the attention of the National Committee. Such a contribution would in no way jeopardize the future of the National Committee. There is enough work to challenge both organizations, and there is need for partnership. I do hope that the Service can be developed in the directions that have been outlined, Mr. Chairman.

DELIRIOUS EPISODES ASSOCIATED WITH ARTIFICIAL FEVER.

A Study of 200 Cases.*

By FRANKLIN G. EBAUGH, M. D., CLARKE H. BARNACLE, M. D., and JACK R. EWALT, M. D.,
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Introduction.

The literature of the past contains numerous studies of deliria but we have found no references pertaining to delirious reactions in mechanically induced fever. We are, therefore, presenting a study of delirious episodes associated with artificial hyperpyrexia administered during the past year.

In this article we are particularly interested in the incidence of deliria developing in courses of pyretotherapy. Attempts were made to correlate the occurrence of the deliria with the disease, the height and duration of the fever, and the administration of sedatives. We were concerned with the elucidation of factors which influence the development and severity of the reactions. Bonhoeffer,[1] Hoch,[2] and Brown [3] have adequately described the organic, affective, and psychogenic components of the infectious and exhaustive states. In a recent article Wolff and Curran [4] stressed the importance of investigating the total person in any study of delirious reactions. By means of case reports we intend to show how individual characteristics and emotional situations influence the incidence and content of deliria.

Investigation.

We wish to present a study of delirious episodes arising in the course of pyretotherapy administered to 200 patients during the past year. The conditions for which they were treated and the average prescribed course of induced hyperpyrexia are itemized in Table I.

Patients were received from the University of Colorado Hospitals and Out-patient Departments, and as referrals from private

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TABLE I.

PRESCRIBED COURSE OF HYPERPYREXIA FOR PATHOLOGICAL CONDITIONS.

Pathological condition.	No. of patients.	Hours of fever.	Temperature. (R)	No. of sessions.	Interval.	Length of sessions.
1. Neurosyphilis (45 patients):		50	105-106° F.	10	Weekly	5 hours
a. General paresis	34					
b. Tabes dorsalis	7					
c. Tabo-paresis	4					
2. Sydenham's chorea	13	25	105-106° F.	10	Daily	2½ hours
3. Multiple sclerosis	14	25	104-105° F.	5	Weekly	5 hours
4. Miscellaneous neuropsychiatric conditions	14	25	105-106° F.	5	3-7 days	5 hours
5. Gonorrhea and its complications	50	25	106-107° F.	5	2-4 days	5 hours
6. Chronic infectious arthritis	27	25	104-105° F.	5	Weekly	5 hours
7. Somatic syphilis	9	50	105-106° F.	10	Weekly	5 hours
8. Pelvic abscess (non-specific)	8	25	105-106° F.	5	Weekly	5 hours
9. Osteomyelitis	7	25	105-106° F.	5	Weekly	5 hours
10. Miscellaneous somatic diseases	13	25	105-106° F.	5	Weekly	5 hours
Total	200 patients					

physicians throughout the state. The sex and age distributions of the cases are listed in Table II. The individuals were drawn from all walks of life. The preliminary study of all patients included a careful physical examination. Advanced age, cardiovascular dysfunction, severe renal disturbance and chest pathology with resultant impairment of respiratory function are contraindications to fever therapy.

An evaluation of the individual's personality was made so that we might be better acquainted with the patient and be prepared for any reaction encountered during the fever. Abnormal mental states were not considered contraindications to treatment. We have carried many excited and uncooperative patients through a therapeutic course. An attempt was made to determine immediate personality problems such as anxiety and fear frequently found in individuals who had recently contracted gonorrhea or syphilis, as well as the depression and anxiety of the chronic invalids in the infectious arthritic and multiple sclerotic groups. These factors were later evaluated in the study of delirium associated with the artificial fever. Sedatives were given to the majority of patients prior to and during the treatment. In the first six months all patients received some form of sedation during the treatment, under the assumption that sedation was necessary for comfort. In the latter half of the year we found it possible to treat many of our patients without sedatives. This incidently gave us a control group of delirious reactions in patients without drugs to compare with the group who received drugs.

The investigation was carried on by the three of us and a staff of six trained nurse-technicians. Our fever therapy research department is located in the Colorado Psychopathic Hospital because the primary purpose of the unit is the study of artificial fever treatment of neurosyphilis. We have found that the department acts as another agent in our liaison service with the other divisions of this medical center and with the practitioners throughout the state. Hyperpyrexia was induced with three Kettering Hypertherms which run a daily double shift from 7 a. m. to 2 p. m. and from 2 p. m. to 9 p. m. The average number of treatments was six a day. Since the installation of the department, one year ago, the 200 patients of the delirium study have received 1324 treatments.

TABLE II.

Sex and Age Distribution in the Delirium Series.

Pathological condition.	No. of patients.	Male.	Female.	0-9 years.	10-19 years.	20-29 years.	30-39 years.	40-49 years.	50-59 years.
Neurosyphilis									
A. General paresis	34	27	7	0	0	4	14	14	2
B. Tabes dorsalis	7	5	2	0	0	0	4	2	1
C. Tabo-paresis	4	3	1	0	0	0	1	3	0
Sydenham's chorea	13	7	6	3	10	0	0	0	0
Multiple sclerosis	14	8	6	0	2	3	5	2	2
Miscellaneous neuropsychiatric conditions	14	8	6	1	3	0	3	6	1
Gonorrhea and its complications	50	32	18	2	4	26	15	3	0
Chronic infectious arthritis	27	10	17	0	5	4	6	9	3
Somatic syphilis	9	4	5	0	3	3	3	0	0
Pelvic abscess	8	0	8	0	0	4	3	0	1
Osteomyelitis	7	5	2	0	4	1	2	0	0
Miscellaneous somatic diseases	13	10	3	1	1	3	5	2	1
Total	200	119	81	7	32	48	61	41	11

Apparatus.

The Kettering Hypertherm * is a large air-conditioned cabinet, through which moist heated air is circulated by a pair of electric blowers. The air is heated by a small electric radiator and the temperature is controlled by a thermostat. The humidity is maintained by a small electric water boiler and is regulated by a humidistat. These air-conditioning devices are housed in a small, fireproof compartment at the rear of the cabinet. Dry and wet bulb temperatures within the cabinet are registered on large dials on the front of the apparatus. The temperature-humidity factors may be regulated at will by a knob on the front of the machine. The air is constantly conditioned by continuous passage through the air-conditioning compartment. The comfort of the patient and the regulation of his temperature depend greatly on the accurate control of the relative humidity. The dry bulb temperature in the cabinet is maintained at 130-150° F., the humidity at 35-50 per cent, and the air velocity at 425 cu. ft./min.

During the period of induction the patient lies nude within the cabinet, only the head protruding, and when the desired temperature is reached, he is covered with a single blanket. The patient rests on an air mattress in a box-like bed which may be rolled in or out of the hypertherm. Sliding panels on each side of the cabinet enable the physician or nurse to observe the skin, to make blood pressure readings, and to take rectal temperatures at frequent intervals. If the occasion arises, the patient may be withdrawn from the chamber in a few seconds. A rubber sponge neck attachment enables the patient to change his position at will. These items represent great advantages of the Kettering Hypertherm over other apparati.

The patient's rectal temperature is elevated to the prescribed level (104-107° F.) in from 40 to 60 minutes. Fever induction by the Kettering Hypertherm depends on two factors: (1) The transfer of heat by conduction from the circulating hot moist air; and

* The Kettering Hypertherm was conceived and perfected at the Miami Valley Hospital, Dayton, Ohio, and at the Research Laboratories of the Frigidaire Division of the General Motors Corporation, Dayton, Ohio. We are indebted to Dr. Walter M. Simpson, and Mr. Charles F. Kettering of the General Motors Co. for the privilege of using three hypertherms at this clinic.

(2) prevention of the normal loss of heat from the body by radiation and evaporation. The control of these factors accounts for the elevation of body temperature and its maintenance at a desired level.

The simplification of the treatment and the ingestion of large amounts of sodium chloride solution (4-6 liters .6 per cent NaCl) to replace chloride loss and maintain water balance, make it possible for many patients to return home two hours after the fever and resume their work the next day.

Methodology.

All the delirious reactions were observed by a nurse-technician and one or more of us. The nurse-technicians have received psychiatric training with particular emphasis on deliria. They have been especially careful to record the verbatim statements of all patients and to note prodromal signs of deliria. The moment a reaction was noted, one of us was at hand to verify the findings, to observe the development and content, and to complete the mental status. If the delirium interfered with the course of the treatment, measures were taken to control the patient's abnormal state. Notations were made of the duration of the delirium, the height of the temperature, happenings in the immediate environment and the relationship to the previous administration of sedatives. The reactions are classified as mild, moderate, or severe.

Mild.—Restless but cooperative; verbose or preoccupied with occasional mumblings; incoherent or irrelevant talk; mood swings or rather fixed mood of elation, depression or irritability; dream-like states or imaginations that are recognized as such; slight clouding of sensorium but oriented if questioned.

Moderate.—Usually uncooperative and restless; increased verbosity or extreme negativism; talk associated with preoccupation, difficult to follow; apprehension marked; mood varies with content; visual, auditory, tactile or gustatory illusions present; occasional hallucinations; cloudy sensorium; disoriented as to time and place; misidentification.

Severe or Classical Delirium.—Very uncooperative, and extremely restless; frequently combative; usually attempts to crawl from the cabinet; shouting, crying, cursing, occasional periods of

mutism; suspicious, fearful, rapid mood shifts; hallucinations and illusions usually of a fearful sort, may be in all spheres or accompanied by delusions; confused and bewildered; extreme disorientation.

The physical components of the delirium vary with the severity of the reaction from mild to severe and include: profuse perspiration, dilated pupils with sluggish reaction to light, tremors of the lips and tongue, generalized twitchings throughout the body, ataxias, speech disturbance, and involuntary evacuation of bladder or bowel.

Treatment.

It is only appropriate that we consider the treatment of the delirious reactions that arise during the course of pyretotherapy. Our study of the delirious reactions has enabled us to anticipate many of these episodes and we feel that there are definite preventive measures which can be used prior to hyperpyrexia.

For example when a case of acute gonorrhea is considered for fever, we frankly discuss the course of treatment with each individual before his acceptance. If the patient is apprehensive and anxious over the hyperpyrexia, considerable time is spent in explanation of the mechanism, the simplicity of the machine, and in pointing out that all physicians and nurses in the department have had treatments in order that they may appreciate his subjective symptoms. If the patient is too apprehensive, treatment is postponed until he is sufficiently desensitized. In addition to individual explanations by one of us before each treatment, the nurses likewise interpret the whole procedure to the patient. He is also reassured concerning the modifiability of his condition. Furthermore he is introduced to the other nurses, the other patients and the entire department so that he may be acquainted with his environment. We believe that these initial measures help greatly in allaying the anxiety which plays a rôle in the development of deliria. The patient is informed that there may be a period of restlessness and anxiety during the induction stage as the body accommodates itself to the increased temperature.

As mentioned previously, in certain individuals where instability is marked, a light sedative is given 30 minutes prior to the treatment, but it is of doubtful benefit. All procedures carried out by the nurse are carefully explained to the patient, for example, the

taking of rectal temperature and blood pressure readings are mentioned each time to avoid possible misinterpretation. Relatives are not allowed in the room as in our experience the presence of members of the family seems to aggravate any apprehension the patient may have; this is particularly true because many of these relatives reflect the patient's fear. It is essential that we eliminate all extraneous noises and that the room be kept as light and attractive as possible.

At the first indication of a delirium a physician is called and the nurse calmly reassures the patient and explains that he is becoming restless and anxious. Special efforts are taken to make him more comfortable by applying iced cloths to the face, changing the blanket and rubbing ice on the skin. The nurse has also been instructed to carry the patient in a conversation along neutral lines of interest. These simple procedures are frequently successful in allaying the apprehension. We have noted that a drop in blood pressure is a warning sign of impending delirium and in this event caffeine is used, and in many cases is effective as an abortive measure. If signs of cerebral edema occur, particularly in the organic reactions, intravenous glucose in a 50 per cent solution is a valuable therapeutic agent. Another worker in this field [8] is of the opinion that pre-fever spinal drainage is of value in agitated paretics in the prevention of cerebral edema, but we have not found it necessary to use this procedure. It is our policy for one of us to stay with the patient during the delirium. When he is showing signs of delirium he is told that he is delirious and that his illusionary phenomena are misinterpretations of his environment. Unusual care is taken in explaining all procedures and diverting conversation is maintained to distract attention from the illusions. As previously mentioned, verbatim statements are recorded and these are discussed with the patient prior to his next treatment. We have found that the majority of deliria can be handled by these simple procedures.

Should a delirium interfere with the treatment, we have found that intravenous sodium amytal narcosis (usually 7½ to 15 gr. I.V.) safely and effectively quiets the patient. It is especially indicated in individuals who show marked motor restlessness and attempt to crawl in or out of the cabinet. Since it is obvious that a narcotized patient cannot ingest sufficient salinized fluid, venoclysis is administered while the patient is in the cabinet.

Severe or Classical Delirious Episodes.

Under this classification we denote the delirious reactions which are classical and would be recognized as deliria by the general practitioner. Mild and moderate deliria may not be noted as such by those outside the field of psychiatry, but may be referred to as "restless," "neurotic individuals," or "persons of poor will power." We are presenting five of our nine severe delirious reactions; seven of the 200 patients had severe deliria, two of these experienced two similar reactions, and five of them had one. It will be noted that four of these seven patients had general paresis, two had gonorrhea and one had chorea. This latter case was in a 17-year-old, hysterical girl of border-line intelligence.

Report of Cases.

Case E. B.—Patient is a 39-year-old white female, housewife, admitted to the Colorado Psychopathic Hospital with a complaint by her husband that she was uncontrollable, that there had been definite changes in her personality, that she neglected her housework, was irritable and combative, forgetful, "mixed up," and unable to sleep during the past week.

Examinations revealed a dehydrated, emaciated, confused, bewildered individual. She was unkempt, talk was overproductive, rambling, and colored by delusions of grandeur. She was paranoid against her husband, "I'll get a hammer and kill him. I'll hit him and if he gets up, I'll hit him again." Sensorium was impaired in all spheres. Superficial insight. "I got syphilis."

Complete examinations including serological findings indicated a diagnosis of general paresis.

Pyretotherapy was initiated on 2/8/36 and during the treatment she developed a moderate delirium. The second fever was on 2/15/36. No sedatives administered. B. P. 130/70. Pulse 80. Temperature 99° R. She was placed in the cabinet at 7.30 a. m. Temperature 105.2° at 8.25 a. m. At 9.00 a. m. temperature was 106°. Pulse 156. There was a generalized tremor throughout the body. The patient was given 50 cc. of 50 per cent glucose intravenously. She was markedly confused, restless and apprehensive. The talk was distractible, incoherent and irrelevant. The patient threshed about in the cabinet, and was difficult to control. She hallucinated, "I'm not Mrs. B., my body's in that tank over there. That man is trying to get into me." She repeatedly crawled into the cabinet. "I can't have my head out here, my body is over there." Complete disorientation and visual hallucinations. "Those men over there, see them? Do you suppose I could have those eggs now? I'm hungry." B. P. 70/40. Temperature lowered to 103.6°. Pulse 110. Patient given caffeine gr. 7½ as a stimulant. She became so disturbed during

the latter part of the treatment that intravenous sodium amytal sedation was necessary. 3000 cc. Ringer's Solution, and 50 per cent glucose, by vein, were administered. She was removed from the cabinet at 1.25 p. m. Postfebrile course uneventful. We would classify this reaction as a severe, or classical delirium of one hour duration.

Five hour treatments without any delirium were administered on 3/11/36 and 3/19/36. On 3/27/36 the patient was placed in the cabinet at 2 p. m. Temperature 99.6° R. Pulse 96. B. P. 110/80. She was quiet, cooperative, and stated, "I'm always happy when they tell me I have to come down here." No sedatives given. Temperature elevated to 105 at 3 p. m. During the period of induction the patient was restless, but talked coherently to the nurse. At 3.15 p. m. her temperature was 105.6°, pulse 140, and B. P. 110/70. She became very negativistic, and refused to answer questions. We noted a tremor of the lips, circumoral pallor and fine twitchings of the fingers. There was incontinences of feces, and the patient was removed from the cabinet. The B. P. rapidly dropped to 70/40. With the cerebral edema, the temperature went to 107°, but was readily controlled. The cerebral edema was combated with 200 cc. of 50 per cent glucose and spinal puncture. The patient then became more alert, but was very resistive, extremely apprehensive and kicked about in the bed. She yelled and screamed, and attempted to talk, but the only speech which was coherent were the words, "I'm dead. Let me alone, I'm dead. I'm in Heaven." There were visual hallucinations of a fearful sort, but we were unable to determine their exact nature. Her mood was one of marked apprehension with rapid shifts to irritability. She was completely disoriented as to time, place and person. 2000 cc. of saline were given by vein. Because of the apprehension, combative behavior and persistent muscular twitchings, we administered intravenous pentobarbital to the point of narcosis. The patient was discharged to the ward with a temperature of 102.2° R., pulse 96, and B. P. 110/60. After a short period of time, there was a moderate circulatory collapse with a fall in blood pressure, an involuntary defecation and muscle twitchings. This was treated with 50 cc. of 50 per cent glucose and intravenous gum acacia. She rallied under this treatment and fell into a deep sleep. When interviewed the following morning the patient recognized her physician. She was quiet and cooperative. Her speech was slurred but coherent, and she stated, "I went to fever yesterday. I died and they brought me back to life. I had to tell them all about the house. Then something happened and I couldn't talk. You wouldn't believe I was dead, and you kept sticking me. My sister was here from Phœnix. I was afraid of death." What did you see? "Someone took me down and dug a grave and put me in it. I couldn't see, but I could hear them put the front piece on the grave. Then they opened my grave and let me see my sister in her room." The patient goes on to describe the details of her death and burial. Her mood was one of elation on being restored to life but toward the end of the interview she became irritable toward another patient on the ward. There were no sequelæ from the previous day's experience.

This patient had two severe deliria in which the organic features were prominent. In the second reaction she had bodily hallucinations similar to those described by Engerth [5] as occurring in malarial treatment of paresis. We noted her personality characteristics were exaggerated during the episode; expansivity was increased and became a prominent feature.

CASE W. H.—A 40-year-old, white unemployed male was examined in the out-patient clinic on 1/7/35 following his wife's admission into this hospital for the treatment of paresis. He complained of numbness in his hands, nervousness, irritability and some speech defect. "If I've got anything I don't know where it could have come from. My wife worked in a store that was filthy and I believe she caught syphilis from drinking out of a glass."

Mental status of this patient revealed a confused individual whose talk was spontaneous but retarded. His mood was one of elation with rapid shifts to irritability. No delusions or hallucinations were elicited. Sensorium cloudy. Insight absent.

Complete examination with serological confirmation 1/7/35 led to a diagnosis of general paresis.

The first hyperpyrexia on 9/25/35 was uneventful except for slight apprehensiveness and restlessness.

The second treatment was on 10/2/35. B. P. 115/90. Pulse 72. Temperature 98.8° R. He was given pentobarbital, gr. 1½, as he entered the cabinet at 8.25 a. m. He received tryparsamide, gms. 2, at the height of fever and was cooperative until 12.15 at which time it was noted that he was incoherent, irrelevant and confused. He said, "Here, Herb—say sister, let me out. I want to beat you at dominoes." At this time his B. P. was 140/90. Pulse 120. He became apprehensive, restless, irritable and uncooperative. "Now listen, I want out of here. I know what time it is." At 1.00 o'clock he was markedly confused, disoriented, and became excited, kicking, yelling and screaming. The increased motor activity was an outstanding feature. There were tremors of the lips and twitchings of all the extremities. He jumped out of the machine and ran into the next room. When the physician attempted to quiet him, he misidentified him, and shouted, "That gang isn't going to get me. I'll fix them." He picked up a one gallon bottle of alcohol and attacked the physician with it. After considerable disturbance, he was quieted, and then became stuporous for 30 minutes. B. P. fell to 65/40, temperature 106° and pulse 180. Caffeine and intravenous 50 per cent glucose stimulation revived him. The patient was admitted into the hospital at 2 p. m. and was in a confused state. This condition lasted for 2-3 hours and was followed by sleep until morning. At this time he was clear and showed no sequelæ from the previous day's experience.

The features of this delirium are organic in nature and resemble the so-called acute delirious mania or collapse deliria described by Hanes.[6] The motor excitement is very prominent and reckless

impulsive movements followed by collapse and stupor characterize this reaction.

CASE F. J.—The patient, a 25-year-old, single, white male aviator was referred to fever therapy on 12/12/35 by a local physician because of recently contracted gonorrheal urethritis. During the preliminary interview he was tense, restless and agitated. Questioning revealed that one month before the patient had been in an airplane crash in which he was the sole survivor of the crew of five. Shortly after the accident, he finished his period of active duty in the air corps and returned home. The gonorrheal infection was the sequelæ of his celebration after his tour of duty. The patient worried about the infection, feared his friends would hear of it, and was very apprehensive about the treatments. He was cooperative; stream of talk coherent but colored by fears. Mood was one of mild depression with apprehension. No delusions or hallucinations. Sensorium intact.

Physical examination revealed a well developed, healthy male whose only pathology was an acute urethritis. The discharge contained numerous gonococci.

The first fever treatment was on 12/12/35. The patient entered the cabinet at 2.15 p. m. Pulse 84, temperature 99.6° R. B. P. 126/80. Because of the marked apprehension, sodium amytal, gr. vi was administered before the treatment. At 2.55 p. m he was given morphine sulphate, gr. 1/6 (H). At 3.05 his temperature was 106°. Restlessness continued and his talk increased. Speech was coherent and he was not disoriented. At 4.05 p. m. visitors came to the department. They expressed some surprise at the height of the temperature and argued among themselves about it. This seemed to disturb the patient and the motor excitement increased. He was given morphine, gr. 1/8, at this time. At 4.15 his B. P. was 114/74, pulse 148, temperature 106.8°. The patient became very overactive, uncooperative, and crawled in and out of the machine. When the nurse attempted to take a rectal temperature, he became very frightened and said, "Don't operate. Did they take one of them off? I suspected something when it got cool in here." At 4.40 his temperature was 106.8° and pulse 156. B. P. could not be taken because of uncooperative behavior. There were twitchings of the lips and fingers, the pupils were dilated and respiration was rapid. Suddenly he climbed out of the cabinet, struck at the nurse and physician, and ran out in the hall screaming for his private physician. His talk was rambling, incoherent, and the content was delusional. "John, John, hold on. I'm going. They can't hurt you. Where are you?" His mood was one of great apprehension with rapid shifts to irritability. After the patient ran into the hall and was asked to return to bed, he became very angry. "I saw you do it. You cut him with an axe. I'll get you." Seizing a large fire extinguisher as a weapon, he attempted to attack the physician. Following considerable excitement the patient was quieted. He expressed visual hallucinations, auditory illusions and paranoid delusions. The sensorium was cloudy and there was complete disorientation. At 5.00 p. m. he was quiet, cooperative, suspicious, and slightly confused, stating, "Are you sure you aren't trying to put something over on me?

I guess my mental attitude had a lot to do with it." At 5.30 his temperature was 103° R. Pulse 120. He was perfectly clear and fell into a sound sleep. This was a classical or severe delirium of 35 minutes duration. The patient walked from the clinic at 6.45 p. m. in good condition.

It is evident in this case that organic features were present as noted by the signs of cerebral edema; however the individual's personality pattern and the acute psychogenic factors elicited in the preliminary interview played a major rôle in the production of the delirium. The large doses of sedatives administered during the induction of fever undoubtedly influenced the patient's course and rendered him more susceptible to a delirious reaction.

CASE C. E.—A 31-year-old, single, white male engineer was referred for hyperpyrexia by a urologist because of an acute gonorrheal epididymitis and urethritis. He was extremely apprehensive before the treatment and worried about his physical state, feeling he wouldn't get well. His occupation required constant attention without rest, and he feared his employer might discover the nature of his illness and discharge him. The patient was definitely unstable and anxious in relation to his immediate situation. Physical examination revealed a healthy, well nourished individual suffering from an acute epididymitis and urethritis, of gonorrheal origin. Laboratory examination substantiated this diagnosis.

During the course of five treatments he suffered one delirious reaction, during the first treatment and of the severe type. It seemed directly associated with the apprehension.

First fever 6/10/35. Sodium amytal, gr. vi was administered prior to fever. He was placed in the cabinet at 8.35 a. m. Temperature 98.2° R. Pulse 84, B. P. 120/80. His temperature was elevated to 106.6° at 9.45. The apprehension and restlessness increased during the induction period and this was accompanied by some confusion. Because of the patient's hyperactivity the temperature rose to 107.4°, pulse 160 and B. P. fell to 60/30. He was removed from the cabinet and given emergency treatment. The patient was stuporous but was quickly revived following intravenous glucose and a hypodermic of caffeine. In a few minutes the patient developed a maniacal reaction. He was very uncooperative, combative, quarrelsome and suspicious of the physician. In a rage the patient struck out and then ran into the hall in the nude. At this time he had an involuntary defecation. His gait was ataxic and he was tremulous, pupils dilated and facies apprehensive. He misidentified those about him, expressed persecutory delusions and was disoriented for time, person and place. The patient soon fell into a sound sleep and a few hours later upon awakening appeared to be clear. The duration of the delirium had been only one hour. Before leaving the department the patient remarked, "I guess I was worried too much. I had too much on my mind. I've been scared stiff about this infection." Remaining course of pyretotherapy uneventful.

This case demonstrates the effect of initial apprehension and emotional conflict over a recently acquired gonorrhea on the course of fever therapy. In addition we feel that fatigue and toxemia, resulting from lack of rest and the infection, played a considerable part in the delirious reaction. Reference to these factors in the production of delirium was made by Hoch [7] in 1906. We are unable to evaluate the effect which the sodium amytal had on the development of the delirium. Organic features were present in this patient's episode to the extent of involuntary defecation. The collapse reaction was similar to that seen in the preceding case.

Individual Characteristics.

In our series of 200 cases, ten patients who were given more than one treatment developed a delirium during each fever session. Of this number three patients were general paretics, four had gonorrhea or its complications, two were suffering from chronic infectious arthritis, and there was one patient with a pelvic abscess. In a short presentation of the content features of the deliria encountered in the above pathological groupings, emphasis is placed on individual characteristics. In successive deliria in the same patient the content and features were essentially of similar nature.[4]

GROUP I: GENERAL PARESIS.

Case I. F.—A 21-year-old, white, married housewife, suffering from early general paresis, was observed during 10 fever sessions. On entrance to the hospital she was fairly well preserved, amiable toward others, somewhat aggressive, and at times sensitive with short periods of apprehension and suspicion especially in relation to the future, fearing she might be sent to the State Hospital at Pueblo. She was interested in group activities and was particularly fond of helping with the kitchen work. She was antagonistic toward her husband who had infected her with syphilis and was contemplating divorce proceedings. During the weekly fever sessions this patient manifested mild and moderate delirious episodes. The content and behavior similar during each treatment: restlessness, elation and confusion. Her talk centered about kitchen work, ward activities, love affairs, and fears of death or commitment to the State Hospital. "Please let me eat my supper." "Did they roll the knives and forks in yet? I'm happy as a lark, I want to kiss him. Change my thread and give me some blue. Did the patients like that? Be careful or they will poison me. You were kissing me when everyone came in. Are they going to send me to Pueblo? He loves my pretty make-up. I've found you at last."

We would look upon this as a secondary delirious episode superimposed on an early general paresis. It is noted that there are exacerbations of her personality characteristics and that her talk centers about her daily interests as manifested on the ward.

CASE W. M.—The patient, a 35-year-old, white, unemployed, depressed paretic was treated through the out-patient department and at the time of this study had completed 3 weekly treatments. Mental status revealed a slow, retarded individual who had long periods of confusion and transitory amnesic spells. His sensorium was fairly well preserved and it was felt that there was little cortical atrophy. The precipitating factors in this organic depression were the desertion of his wife, the loss of his business and friends, and the subsequent discovery that his wife had become a prostitute. He had a moderate delirious episode during each treatment and a depressive content was manifest in stereotyped productions. Suspicion and apprehension appeared on each occasion but varied in intensity. He made references to his wife and expressed a desire to forget the past. "All right, Colorado, go ahead and slaughter me. Don't put this in the paper. Forget, forget. Call my mother-in-law. I wish I could hate like I love. God help them when I do. I lived with my wife six years, I love her. I don't want her to do wrong—if it weren't for him." "My mother just came by and said, 'Bob has been drunk for a week.' I won't drink that, there is something in it. She called me Grandpa! I hate to be called names. Too old for treatments. You are yelling it all over. Forget! Forget! Forget! Think, think and then forget!"

This case demonstrates the effect of mood and preoccupations upon the productions of a depressed paretic during delirious episodes. The content was of a self-condemning and self-depreciatory nature with some paranoid projections. The successive delirious episodes were recapitulations and clearly showed the patient's underlying mood.

GROUP II: GONORRHEA.

CASE W. C.—A 35-year-old, single, white salesman was given a course of eight fever sessions at three-day intervals in the treatment of acute gonorrheal arthritis and urethritis. During each heating he developed delirious episodes of similar nature. It was noted that prior to each fever he was apprehensive and fearful. "Are you sure it won't kill me. I've gone through hell with this trouble. I haven't been able to sleep or eat or do anything." Obviously this individual was unstable and manifested acute anxiety over his recently acquired affliction. The deliria were mild and moderate in intensity with considerable verbalization and restlessness. "They are going in the wrong direction. Hurry, hurry. Over to one side, about 200 yards. That's the fellow that's going. I'm dying. Right back in that corner—this

isn't a story. The other prisoners told me and I think you ought to know. Did you send for the fellow that kicked me. To hell with the price of nurses. Hand in hand, here we stand. Is that a bull snake over there? How did you get to India? O. K. Mother, I'm so ashamed. I tried to get that spoon. Honey, give me a piece of watermelon and wrap it around your neck. Mama!"

This individual evidently had been under extreme emotional conflict over the contraction of gonorrhea. He felt he would never get well and the appearance of the cabinets produced considerable fear and anxiety. In addition, loss of weight, and insomnia with resulting fatigue, accentuated his susceptibility to the delirious episodes. Furthermore, gonorrhea is treated at intervals of three to four days at temperatures in the region of 107°; this in itself added to the existing fatigue in this unstable individual, resulting in a delirium during each treatment. The content of the productions substantiate the impression of a previously existing anxiety.

CASE H. Z.—A 36-year-old, married, white business man was treated for acute epididymitis. He had a moderate delirious episode during each of the five treatments given at three day intervals. Prior to fever he was apprehensive, worried and depressed over his infection. "I hope my wife doesn't find it out. It would be terrible if she did. I've suffered enough." His behavior was similar during each delirium and characterized by motor restlessness, kicking and outbursts of crying. His talk was often incoherent but understandable, and spontaneous productions were similar in the successive episodes. "Why can't I do what I want to in my own home. My wife is wonderful to stick with a guy like me. I think what a darned fool I am. If she only felt differently. You're so puny. Cellophane. Hey Bill. This is a hell of a ball game. Is that all the drink I get after playing so hard? You chase the dogs out of here. Well, well. See what the missus has to say."

We are dealing with a depressed personality, in acute distress over his gonorrhea, who was particularly concerned about keeping his infection a secret from his wife and worried over her attitude should she discover his predicament. It is interesting to compare his deliria to W. M., the depressed paretic.

GROUP III: CHRONIC INFECTIOUS ARTHRITIS.

CASE G. E.—The patient, a 40-year-old, married, white unemployed gardener was treated for chronic infectious arthritis. During each of five weekly sessions he developed a mild delirious episode. Prior to treatment the patient was discouraged and depressed over his illness, which had incapacitated him since 1915, and over his inability to support his family. He gave a history of "shell shock" at the time of the war.

During the delirious periods mumblings were constant and had a similar content. "I'm a sinner. I'm a softie. I think I'm an evangelist. I'll preach to you. I'm half nuts. Here I am raving about Ethiopia when I'm a wreck myself. I was a little too close to a bullet during the war and I have to keep on the go all the time."

The content is self-explanatory and indicative of the individual's depressive mood. Continued invalidism and unsuccessful treatment for his arthritis had probably added to the patient's emotional burden and played a rôle in the development of the deliria.

GROUP IV: PELVIC ABSCESS.

CASE F. J.—The patient, a 26-year-old housewife was treated for a non-specific pelvic abscess. She had been seen by the liaison psychiatrist prior to the infection and diagnosed as an hysterical reaction in a person of low intelligence. During each of five treatments given at three day intervals she had a mild or moderate delirium characterized by elation, facetious talk and push of activity with twitchings of the trunk and extremities. Her productions centered about the illness and her hypochondriacal complaints. "Is my heart beating? I've been dizzy all the time and I get numb. I'm just nervous. I do this when I have a nightmare. Boy am I happy. You know that other patient wanted to lie down and rest. I could have moved over but I didn't. I'd love to go to church, honey. Isn't it lovely? I didn't have to put my head in that little patch. There is something wrong with my husband. He must be an Ethiopian. Isn't it a shame the house burned down? I'm happy, so happy."

The delirious episodes in this case accentuate the personality pattern which is characteristic of an hysterical individual of limited intelligence.

RESULTS.

Referring to Table III we note that in a series of 200 patients treated in 1324 hyperpyrexia sessions, a total of 331 delirious episodes occurred. Exactly one delirium occurred in every four treatments. It should be remembered that these deliria are drawn from a heterogeneous group of pathological conditions, and these patients were subjected to temperatures varying from 104° to 107° (see Table I) with the added feature of sedation in some cases. 108 of these 200 patients developed deliria while 92 completed their course of pyretotherapy without experiencing this complication. This means that over half of our cases at some time or other during hyperpyrexia showed at least a mild delirious reaction.

TABLE III.

DELIRIOUS EPISODES ASSOCIATED WITH ARTIFICIAL FEVER.

Pathological condition.	No. of patients.	No. of treatments.	Patients without deliria.	Patients with deliria.	Mild deliria.	Moderate deliria.	Severe deliria.	Total deliria.
Neurosyphilis:								
A. General paresis	34	283	10	24	60	40	6	106
B. Tabes dorsalis	7	61	5	2	12	2	0	14
C. Tabo-paresis	4	24	3	1	1	0	0	1
Sydenham's chorea	13	112	9	4	4	3	1	8
Multiple sclerosis	14	87	5	9	16	2	0	18
Miscellaneous neuropsychiatric conditions	14	68	7	7	8	8	0	16
Gonorrhea and its complications	50	317	12	38	65	48	2	115
Chronic infectious arthritis	27	149	20	7	13	3	0	16
Somatic syphilis	9	81	4	5	8	1	0	9
Pelvic abscess	8	39	4	4	6	5	0	11
Osteomyelitis	7	59	2	5	9	6	0	15
Miscellaneous somatic diseases	13	44	11	2	2	0	0	2
Total	200	1324	92	108	204	118	9	331

Of the 331 delirious episodes, 204 were of the mild type, 118 moderate and nine severe or classical. In comparing the delirious reactions of the two largest groups of patients, namely general paresis, and gonorrhea and its complications, we find that the development of deliria per treatment is almost the same. There were 106 delirious reactions during the 283 treatments given the paretics, in contrast to the 115 deliria developing during the 317 treatments given to the gonorrheal group. In the first group one delirium developed in every 2.66 treatments, and in the latter, one delirium in every 2.75 treatments. There were fewer patients in the paretic series (34) as compared with the gonorrheal group (50), but the first group received an average of 8.32 treatments per patient as contrasted to 6.34 treatments in the latter; 24 of the 34 paretics had at least one delirious episode, while 38 of the 50 gonorrhea cases were similarly affected. At this point it might be well to emphasize that in paresis we are dealing with a definite organic disease of the brain, with psychotic individuals with added features of fever and in some cases sedation; while in the gonorrheal group there is no psychosis but many cases presented personality problems with the usual addition of anxiety and conflict over the development of the venereal infection, plus a higher temperature (106°-107°), and in many cases the added feature of sedation. There are practically the same number of mild and moderate deliria in each group but more severe or classical deliria in paresis (six) than in gonorrhea (two).

In 13 cases of chorea only four became delirious, in these individuals there was a total of eight deliria. The fact that fever sessions for chorea are only 2½ hours in duration and are less fatiguing may play a rôle; however, in general we find the delirious episodes occurring early in the fever before 2½ hours have elapsed. One would expect more frequent and intense deliria in children of a group such as we treated in our chorea series (see Table II). In this connection we might say that none of the children (below ten years) from the other groups became delirious. We realize, however, that the number of children in this group is small (seven).

In the chronic infectious arthritic group only seven of the 27 patients developed a delirious episode during the course of treatment; the majority (13) of these deliria were of the mild type. The probable explanation of the infrequency of deliria in this

group is that a lower degree of pyrexia is maintained (104°-105°) and the treatments are given only once a week. One would expect, nevertheless, that the chronic invalidism with pain and suffering over variable periods of time would have been more predisposing, and one might expect a comparatively larger number of delirious reactions.

A review of the miscellaneous neuro-psychiatric conditions (14 cases) reveals interesting facts, although the series is too small to permit any conclusions. In four cases of encephalitis, two developed deliria; of two toxic psychoses, one became delirious in four out of five treatments; the only case of schizophrenia treated had a delirium; of two depressions treated both had episodes; in the two manic patients treated with full courses there were no delirious reactions.

The relationship of sedatives to the incidence of deliria presents many interesting features. The sedatives used in the majority of cases were sodium amytal, gr. 3 to 6; morphine sulphate, gr. $\frac{1}{8}$ to $\frac{1}{4}$; in some instances, pentobarbital, gr. $1\frac{1}{2}$ to gr. 3, and pantopon, gr. $\frac{1}{3}$ were given. In the cases of chorea given sedation, codeine sulphate, gr. $\frac{1}{2}$ to 1 gr., were used. It will be noted in Table IV that although the treatments administered without sedatives and sessions in which drugs were used are not comparable in number, certain speculations can be made. In the instance of general paresis the ratio of deliria to treatment is approximately the same in the two groups, but the incidence of severe deliria is notably higher during the treatments carried on without sedatives. A fairly comparable group is found in the multiple sclerotic series and it is obvious that there is little difference in the incidence of delirious episodes. In both the gonorrhea and infectious arthritic groups the occurrence of deliria in the group without sedatives is minimal. In a few isolated treatments, large amounts of drug were given in repeated doses in attempts to quiet the patient, and we felt in these cases that the drug played a definite rôle in the development of the delirium. (See Case F. J.) It is our impression that a mild sedative such as sodium amytal, gr. 3, or pentobarbital, gr. $1\frac{1}{2}$, has little or no effect on the occurrence of delirium during hyperpyrexia. We feel that if repeated doses of these drugs are administered and if morphine or pantopon is added, delirious episodes are liable to occur in the more unstable patients. In a few instances we find

TABLE IV.

RELATIONSHIP OF SEDATIVES TO INCIDENCE OF DELIRIA.

Pathological condition.		No. of treatments.	Without deliria.	Mild deliria.	Moderate deliria.	Severe deliria.	Total deliria.
General paresis, 34 patients	With sedative	237	150	52	33	2	87
	Without sedative	46	22	8	7	4	19
Tabes dorsalis, 7 patients	With sedative	47	34	10	2	0	12
	Without sedative	15	13	2	0	0	2
Tabo-paresis, 4 patients	With sedative	24	23	1	0	0	1
	Without sedative	0	0	0	0	0	0
Sydenham's chorea, 13 patients	With sedative	92	87	4	0	1	5
	Without sedative	20	17	0	3	0	3
Multiple sclerosis, 14 patients	With sedative	53	42	11	0	0	11
	Without sedative	34	27	5	2	0	7
Miscellaneous neuropsychiatric, 14 patients	With sedative	55	44	7	4	0	11
	Without sedative	13	8	1	4	0	5
Gonorrhea, 50 patients	With sedative	300	188	65	45	2	112
	Without sedative	17	14	0	3	0	3
Chronic infectious arthritis, 27 patients	With sedative	131	115	13	3	0	16
	Without sedative	18	18	0	0	0	0
Somatic syphilis, 9 patients	With sedative	69	61	8	0	0	8
	Without sedative	12	11	0	1	0	1
Pelvic abscess, 8 patients	With sedative	36	27	6	3	0	9
	Without sedative	3	1	0	2	0	2
Osteomyelitis, 7 patients	With sedative	58	43	9	6	0	15
	Without sedative	1	1	0	0	0	0
Miscellaneous somatic diseases, 13 patients	With sedative	39	37	2	0	0	2
	Without sedative	5	5	0	0	0	0
200 patients		1324	993	204	118	9	331

that a light sedative quiets the patient prior to treatment and perhaps adds to his comfort throughout the heating. However, as a general policy, we now administer no sedative during the course of treatment because most patients are just as comfortable without it, and because we are interested in carrying out a longer study of delirious reactions in relation to hyperpyrexia alone.

The general average duration of the 331 delirious episodes that occurred during the 1324 hyperpyretic sessions was 1 hour 15 minutes. It is interesting to note that the duration of the deliria occurring in the paretic group was 1 hour 40 minutes as compared to the gonorrhea series in which the duration was 1 hour 3 minutes. There was no appreciable difference in length of the reaction in the other pathological conditions. The majority of the episodes occurred during the first or second hour, after the elevation of the temperature to the prescribed level. There were a number of deliria which were manifest in the latter part of the first hour session, and in these cases no doubt fatigue played a rôle in their production. In only one individual did the delirium last a considerable length of time and to the extent that one could consider it to be a post-febrile reaction. This case was an apprehensive, poorly organized negress treated for gonorrheal salpingitis after this series was compiled. She remained confused and hallucinatory for 48 hours following her fifth heating.

In a comparative study of the duration of deliria in the group with and without sedative administration we found no significant difference.

The distribution of deliria per patient presents an interesting feature. Of the 108 patients who developed a delirious reaction, 43 developed only one; the vast majority of these were during the first session (80 per cent).

Comment.

At first glance it would seem that 331 delirious episodes in 1324 fever sessions is an unusually high incidence. It is our feeling that most of the mild episodes would not be classified as deliria by those outside the field of psychiatry, and this group comprises the majority of our series (204). We have had comparatively few (nine) severe or classical deliria and we agree with Desjardin [9] that deliria are rare if his expression "true" signifies classical or

severe deliria. We have used the term delirious episode rather than delirium because of the short duration of the reaction. As noted under results the general average duration was 1 hour 15 minutes. We feel that the word delirium connotes a reaction extending over a period of time ranging from days to months.

As is true in all delirious reactions we found a wide variation in the picture produced in individual patients. We were unable to note any characteristic content or trend in the various disease groups, nor was the picture specifically affected by the height or duration of the fever. The administration of sedatives likewise did not affect the clinical picture, and as previously noted, it is our opinion that light initial sedation played a very small rôle in the production of delirious episodes. The clinical picture "is in a large part dependent upon the individual equipment and experience of the subject."[4] We have noted individual features in patients with recurrent deliria which reflect their dominant interests, habit patterns and other personal characteristics. We could find no evidence that age or sex played any rôle in the incidence of deliria, except that relatively few episodes occurred in the children that we have treated.

The influence of the height of fever on the incidence of delirium is difficult to evaluate. In the two largest groups of patients, we have a psychotic (paresis) versus a non-psychotic group (gonorrhea) and we find the incidence of deliria about the same, but the latter group is subjected to a temperature which is at least one degree higher (106°-107°). We might consider the deliria in paresis as secondary and comparable to these observed by us and reported by others as occurring during malarial therapy.[5, 10a, b, c]

It was noted under "Results" that 43 of the delirious patients had only one episode, and in this instance it was usually the first treatment. This implies that the initial anxiety over the treatment is frequently gone after the first session when the patient understands what the treatment consists of. The average individual is comfortable throughout the treatment, and depending on his personality characteristics, may hum, sing, or chat with the nurse, although many become lethargic and sleep throughout the session. Each nurse and doctor in the department has had at least one fever treatment for the purpose of seeking a better understanding of the reaction of the various patients. From our personal experience

we agree that the heating produces subjective sensations peculiar to the individual. Some of us became elated, some anxious, and others lethargic. In no way was the experience a harrowing one.

We have indicated by case reports that personality problems and emotional instability renders a patient susceptible to delirious reactions.

From clinical observation it is felt that cerebral edema is present during the delirious reactions and is particularly evident in the moderate and severe types. The most characteristic and consistent signs of cerebral edema are manifest in the paretic group.

SUMMARY.

1. We have observed 331 delirious episodes occurring in the course of 1324 hyperpyrexia sessions administered to 200 patients suffering from various pathological conditions. There were nine severe or classical deliria.

2. Attempts were made to correlate the occurrence of the deliria with the disease, the height and duration of the fever, and the administration of sedatives.

3. In case studies specific factors were recorded which influenced the development and severity of delirious episodes.

4. We noted individual features in patients with recurrent deliria which reflected their dominant interests, habit patterns, and other personal characteristics.

5. The prevention and treatment of delirious episodes are discussed.

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DISCUSSION.

DR. CLARENCE NEYMANN (Chicago, Ill.).—I would like to ask Dr. Barnacle and Dr. Ebaugh certain questions about their excellent paper. In 1934 Neymann and Osborne published the fact that the body has definite temperature ranges under ordinary conditions. In other words, if the rectal temperature is 98.8° F. the temperature of the skin of the big toe will be about 91° F., the temperature of the skin of the abdomen about 93° F. and that of the superficial muscles of the abdomen about 95° to 96° F., the deeper muscles will be still warmer while the cisterna magna, the liver and the Hunterian canal will show a temperature approximately equal to that of the rectum. Now whenever fever is produced these temperature gradients will be maintained provided the fever is induced by internal heating. When we produce fever by means of physical agents we must use external or penetrating heat. We have shown that external heating which has been employed by Dr. Ebaugh and Dr. Barnacle causes certain definite physiological responses of the body. Firstly, the temperature gradients of the body are reversed and the surface becomes hotter than the internal organs. Secondly, there is relative inhibition of perspiration. If a fever of 106° F. is maintained for five hours by penetrating heat about five thousand grams of sweat will be produced. If we maintain the same temperature for the same number of hours in the same patient by external heating, the perspiration will be reduced to about half this amount. Certain drugs, notably hyoscine often used as a sedative, inhibit sweating while others, notably pilocarpine, increase the output of perspiration. Therefore, hyoscine should not be used for sedation during sessions of artificial fever.

According to our clinical experience, though we have no definite statistics, the number of mild delirious reactions seem to be somewhat in proportion to the modality used. Certainly deliria occur more frequently if external heating devises are employed. Therefore, I would like to ask Drs. Ebaugh and Barnacle whether the skin temperatures of their patients were measured. Thus it could be shown whether the usual and normal relationship of a comparatively high internal temperature and a comparatively low external

temperature is maintained during the febrile period. I have had no personal experience with the Kettering hypertherm, but have used similar machines, and believe that the reversal of the temperature gradients and the inhibition of perspiration are the main reasons why Drs. Ebaugh and Barnacle have noted so many deliria. We have observed only two severe deliria, though we have treated about five hundred patients and most of these patients were given more than ten hyperpyrexia treatments. I, therefore, wonder if these deliria are not possibly caused by the secondary effects of sedative drugs or more likely by the modality employed for producing fever. I am rather inclined to believe that we are dealing with an after effect of external heat. Certainly, we have observed no great number of mild delirious states except when we employed external heating machines. We have often observed that circumorbital pallor precedes a serious condition of a patient. I do not know the physiological reason of this phenomenon but I am certain it is a definite danger signal. I would like to ask Drs. Ebaugh and Barnacle how often they have observed circumorbital pallor, especially in those patients who later became delirious.

Dr. Waterman (Hastings State Hospital, Neb.).—I was quite interested in the desensitization of the patient by introducing him to members of the staff before treatment is started, and I want to ask Dr. Barnacle what percentage of patients suffered a delirium during their first treatment, and then had no more delirium during the subsequent treatments.

Chairman Heldt.—From the standpoint of environment, as to the machines used, the methods employed and the general technique applied, we practically duplicate in the Henry Ford Hospital in Detroit the set-up described and used by Drs. Ebaugh and Barnacle. Our first Kettering hypertherm was installed in November 1933. Two more were added in March 1934. Accordingly, we have had liberal opportunity for observations such as reported by Dr. Ebaugh and Dr. Barnacle.

In our experience, the mild deliria, associated with the therapy in question, are judged to be more or less dependent upon the technique and the sedative drugs employed. The elevated temperature throughout artificial fever is clearly a strong stimulus in terms of psychiatric reactions, and may in itself produce a delirioid reaction. Such deliria we regard more as physiological responses than as morbid manifestations. The general psychiatric status of the patient is also a very important factor, as is his psychiatric preparation,—explanations, assurance and reassurance.

In the matter of the drugs used, we give definite heed to the physiological law:—"All depressor substances also exert a stimulating effect when used at appropriate dilution." Among the drugs enumerated by Dr. Barnacle we have found sodium amytal, morphine, and pantopon delirifacient. Small doses of sodium amytal, roughly 1½ grains to 6 grains, usually stimulate. Larger doses, 12 to 15 grains, not infrequently give early evidence of toxicity. In our hands, sedormid has proved generally more helpful than sodium amytal and is of especial value in those psychotic paretics who are not open to

explanations and under the stimulus of elevated temperature are more interested in kicking apart the machine that surrounds them than they are in cooperating.

DR. CLARKE H. BARNACLE (Denver, Colo.).—In answer to the comments of Dr. Neymann, I would like to say that we have not made determinations of skin temperatures. We have followed the work of Drs. Simpson and Kendall of Miami Valley Hospital, in Dayton, Ohio. In a detailed study of thermocouple temperatures of the blood, muscles, vagina, rectum, spinal fluid and other organs, these workers concluded that the temperatures of various organs of the body closely follow that of the blood, if the patient is treated in the air-conditioned Kettering Hypertherm. We feel that induced fever by external means of hot, moist air produces the same physiological effects as by other accepted methods. The rectal temperature of the body is closely correlated to the temperature of the blood.

Circumoral pallor is surely an interesting sign and one should be alert to note its appearance. We find, however, that it is not a usual sign of impending deliria, but more of an indication of impending vasomotor collapse or cerebral edema. Should it appear one should be alert to remove the patient from the cabinet if additional signs of collapse occur.

Dr. Waterman brings up an interesting point. Forty-three of two hundred cases had only one deliria and in the vast majority of these cases (about 80 per cent) the delirium occurred during the first fever session. This points toward psychogenesis in the production of deliria and generalized anxiety over treatment by a relatively new method.

Dr. Heldt mentions the use of sedormid in the sedation of hyperpyretic patients. We have had considerable experience with many drugs and feel that amytal in small doses (grains iii) is not delirium-producing in its effect. As mentioned in this paper we have discontinued the use of drugs since we feel in general there is no difference in the incidence of deliria with or without sedation; with the one exception that severe deliria is most apt to develop in general paresis if sedatives are omitted. We are anxious, too, to complete a longer period study of deliria without sedatives so that the rôle of sedation might be definitely ruled out in the production of deliria.

Dr. MacLean questions the ability of one to determine the length of deliria. We use the typical signs of deliria as criteria. It is true that the episodes cannot be measured in seconds but an accurate estimation of the length of deliria can be made upon agreement between the attending psychiatrists.

There seems to be a definite relationship between the height of temperature and the production of deliria. It seems only rational to suppose that with higher temperatures there is apt to be a more severe cerebral edema. We have noted relatively few deliria with temperatures of 101° to 102° and in these occasional episodes it is felt that they are almost totally psychogenic in origin rather than as the result of fever. These cases presented no organic features of deliria which generally occur at higher temperatures.

Comment.

THOMAS WILLIAM SALMON MEMORIAL LECTURES.

The Salmon Memorial Lectures for 1936, given recently at the New York Academy of Medicine, by Dr. Samuel T. Orton of New York, were a comprehensive recapitulation of present-day knowledge of reading and writing difficulties and their psychiatric import.

In the first of the three lectures, April 10, Dr. Orton pointed out the similarity in effect between language losses in the adult due to brain destruction and disturbances in language seen frequently in children as a developmental disorder. In this connection, he said:

> There is no direct relation between the amount of loss in language and the size of the area of destruction, suggesting strikingly that we are dealing with a disturbance of a normal physiological process in these language disorders and not, as we held in the older view, with the destruction of brain depositories for words.

With reference to "handedness" and its effect on speech, Dr. Orton said there was probably a hereditary tendency toward unilateral superiority in the brain and while the brain centers were not open to the influence of training, the "handedness" of the individual was, he believed; the result being an intricate combination of hereditary trend and the effects of training. Two extremes of opinion were held, he said, in regard to the effect of shifting a natural left hander to right handedness. Some feel that such a shift never makes trouble, while at the other extreme are those who feel that every effort at shifting "handedness" will result in some difficulty.

Dr. Orton concluded:

> Our own findings would place the answer to this question on an individual basis. Tests and observations of the child himself are considered necessary to determine how he should be trained.

In the second lecture, April 17, Dr. Orton considered each language disorder in detail, including congenital word blindness, strephosymbolia or twisted symbols, developmental agraphia or

special difficulty in learning to write, developmental word deafness, motor speech delay, "double left handedness" and stuttering in childhood.

Of stuttering in children, Dr. Orton said:

> Stuttering children fall into two main groups. Many show a speech impediment from the time when they first begin to talk, others develop a normal and facile speech which continues until the sixth or eighth year, when stuttering begins.

The significance of this, Dr. Orton pointed out, was that at these two age levels the child is beginning to establish new habits; in the first instance, habits of speech and handedness, and in the second he is beginning to learn the graphic language, reading and writing, and beginning to integrate these new unilateral brain functions with his speech.

It is very common, Dr. Orton said, to find a considerable measure of special writing disability coexisting with stuttering and many children have as much difficulty in acquiring writing as they had in speech.

In his final lecture, April 24, Dr. Orton stressed the hopeful outlook for children suffering from language disorders now that the older view, which held that they were deprived from a defect in development of certain parts of the brain, has been abandoned. The present viewpoint, he said, having as it does, a physiological background, opens the door to experiments in retraining and the results of such experiments during the past ten years amply justify the opinion that the great majority of language disorders, if recognized early and properly treated could be greatly benefited if not completely corrected.

Dr. Orton stated that language disorders carried with them certain emotional conflicts, feelings of inferiority, seclusiveness, frustration and emotional instability, in some cases, with marked variability depending on the individual reaction to the disability. Speaking in this connection, he said:

> Any attempt to unsnarl the relation of emotional and organic factors in the development of the child is like attempting to separate the warp and the woof of cloth. The result is there is no cloth left. The emotional reactions of the child and those factors which limit or determine his intellectual and academic development interdigitate so completely that both must be considered an essential part of the picture at any stage.

Dr. Orton is the fourth American psychiatrist to be honored by appointment as Salmon Memorial Lecturer because of distinguished contributions to psychiatry.

The lectures which have been established to perpetuate the memory of the late Dr. Thomas W. Salmon have been given in previous years by Dr. Adolf Meyer, Dr. Charles Macfie Campbell and Dr. William A. White.

Dr. Orton's lectures will be available in book form through the W. W. Norton Publishing Company in the near future.

CONFERENCE ON UNDERGRADUATE INSTRUCTION IN PSYCHIATRY.

On April 8, 9, and 10 of this year a conference on undergraduate instruction in personality function and psychiatry was held in Baltimore under the auspices of the Division of Psychiatric Education of the National Committee of Mental Hygiene, with the support of the Commonwealth Fund. The meetings took place in the Henry Phipps Psychiatric Clinic under the chairmanship of Dr. Adolf Meyer. Invitations to participate were extended to the departments of psychiatry of the medical schools of the United States and Canada, as well as to some other psychiatric institutions, with the gratifying result that 115 psychiatrists from 41 schools attended.

The subject matter of the conference was strictly limited to the teaching of psychobiology and psychiatry to *undergraduates; i. e.,* to the rank and file of those physicians who have to enter upon the responsibilities of internships and practice without the benefit of special postgraduate training. The primary aims of the meeting were twofold; (1) an interchange of factual information concerning the scope and methods of psychiatric instruction in our medical schools during the present teaching year, with full recognition of the inevitable differences in the resources of each school in regard to available time, hospital facilities, teaching staff and psychiatric material; (2) the utilization of this information for a constructive discussion of the means by which we can best attain the goals of undergraduate psychiatric instruction during the coming year, namely, the assurance that our graduates will receive,

in addition to a reasonable knowledge of psychiatric diagnosis and therapy, an adequate training in understanding their patients as people rather than as a mere summation of organs and systems, through the general and special practice of medicine.

It was only fitting that the first day of the meeting should be devoted to a review of the general patterns with a detailed exposition of psychiatric teaching at The Johns Hopkins Medical School, as developed by the esteemed chairman of the conference and dean of American psychiatry, Dr. Adolf Meyer. Following a few introductory remarks on the general aims of the meeting, Dr. Meyer outlined the course in psychobiology given to the first year students, stressing objectivity, simplicity, directness of methods and the material of concern. The speaker emphasized particularly the importance of a mastery of the personality study, made by each student of himself and contrasting fellow students, in giving substance and reality to the concrete facts constituting and determining the successes and failures of human functioning. In the second year course, as presented by Dr. Muncie, the student is given an introduction to clinical psychiatry, with special emphasis upon the complaint factors causing concern and upon methods of examination, and with opportunity personally to examine patients presenting various complaints and samples of psychopathology. Outpatient material is utilized by Dr. Richards during the third year, when the student is expected to do complete work-ups with psychotherapeutic interviews. In addition, state hospital material is demonstrated. In the fourth year the student is offered work on the wards and required to follow six cases every day for one month under the direction of the resident, Dr. Rennie. The conference had the opportunity to see the actual work of the third year students with dispensary patients.

In general, the Hopkins teaching staff gave to the conference a demonstration of psychiatric undergraduate teaching under specially favorable conditions, in a manner that is only possible in a university with fairly large resources. In interesting contrast to this was the presentation by Dr. Ackerly of the scope and possibilities of psychiatric instruction in smaller schools with more limited teaching facilities, in which he stressed the advantages to be derived from complete psychiatric social service work-ups by the students themselves. Subsequent to these presentations reports

of the patterns and general aims of undergraduate training in various schools were given by Drs. Farrar, University of Toronto, Singer, University of Illinois, Graves, St. Louis University, Ziegler, Albany Medical School, Hartwell, University of Buffalo, Neymann, Northwestern University, McGraw, Columbia University, Campbell, Harvard Medical School, and Ebaugh, University of Colorado. In spite of considerable variation in the number and distribution of the hours allotted to psychiatry, there was general agreement that preclinical instruction in psychobiology and psychopathology was highly desirable.

The second day was devoted to a more detailed consideration of how much clinical psychiatric knowledge should be expected of the undergraduate. Following a few pertinent introductory remarks by Dr. Meyer on the general goal and range of content of undergraduate training, the instruction in the various reaction types was discussed by Drs. Billings, Campbell, Ebaugh, Henry, Kahn and Meyer; and special opportunities for teaching, as, *e. g.*, in state hospitals, out-patient clinics, social service work, etc., were discussed by Drs. Ackerly, Billings, Freeman, Gildea, Kanner, Katzenelbogen, Singer, Stevenson and Yorshis. The evening session was taken up by a consideration of the teaching of psychopathology and psychotherapy to undergraduates. Dr. Malamud outlined the course in psychopathology given by him at the University of Iowa, emphasizing the importance of a clear understanding of formal concepts and actual clinical states before attempting to grasp complicated genetic relationships. Dr. Ziegler discussed briefly the teaching of psychopathology and therapy at the University of Albany. An interesting difference of opinion was expressed by Drs. Rado and Schilder in relation to the teaching of psychoanalysis to undergraduates; whereas Dr. Rado expressed much doubt as to the advisability of didactic instruction in this field, and pointed out certain dangers involved, Dr. Schilder felt that such instruction was entirely feasible. Dr. Diethelm presented a detailed outline of psychotherapeutic instruction for students, stressing the need for clear differentiation of therapeutic measures, and advocating that the student be taught such procedures as suggestive therapy, free association and distributive analysis.

The last session was devoted to a welcome exchange of opinion on the subjects hitherto discussed, as well as to a consideration of

such general problems as premedical training in psychology and sociology and some of the fundamental concepts and theoretical and practical principles evolving from experience in teaching and in the organization of the courses. Special discussions were offered by Drs. Cameron, Campbell, North, Wilson, Gregg and Allen. A committee was appointed to make specific recommendations for changes in psychiatric education on the basis of the opinions expressed by the participants of the conference. We are certain that everyone felt a sense of gratitude to the chairman for his able and stimulating management and leadership. The proceedings of the conference will be published by the National Committee of Mental Hygiene with the generous support of the Commonwealth Fund.

F. G. E.

News and Notes.

MEETING OF THE AMERICAN PSYCHIATRIC ASSOCIATION.—The ninety-second annual meeting of The American Psychiatric Association was held at the New Hotel Jefferson, St. Louis, Mo., May 4 to 8, 1936.

The sections on Convulsive Disorders and on Forensic Psychiatry had morning and afternoon sessions on Monday, May 4. In addition, the section on Convulsive Disorders had an informal round table and dinner meeting on Monday evening, there being 146 present.

On Tuesday, May 5, the regular sessions of the Association began, Dr. Clarence O. Cheney, the President presiding. After an invocation by the Very Reverend Sidney E. Sweet, Dean of Christ Church Cathedral, the addresses of welcome were given by Dr. E. Lee Cady, President of the St. Louis Medical Society; Dr. W. McKim Marriott, Dean of the Washington University Medical School and Associate Dean, Dr. Charles H. Neilson, of the St. Louis University School of Medicine; Dr. C. Macfie Campbell, President-elect responded for the Association.

In his presidential address, Dr. Cheney made a number of most interesting observations from the past history of the Association, with pertinent references to present-day problems and those of the future. Dr. Cheney's address is printed in full in this number of the JOURNAL.

There were three section meetings on Tuesday, Wednesday and Thursday, two on Friday. One section on Wednesday morning and afternoon was devoted to joint sessions with the section on Psychoanalysis and the American Psychoanalytic Association. There were also joint sessions Thursday morning and afternoon with the American Psychopathological Association. On Thursday afternoon and Friday morning sessions were devoted to the section on Mental Deficiency. On Thursday morning and Friday morning, a section considered administrative problems. Other subjects covered were psychiatric aspects of medical problems, investigation and theory, neuropathology, therapy and diagnosis.

The scientific and technical exhibits were located on the mezzanine corridor near the meeting halls. The exhibits were a part of the scientific program and added greatly to the interest and educational value of the meeting. Various studies from the laboratory and from the field of clinical psychiatry were presented. The Association wishes to commend especially the individual exhibitors who have developed their displays entirely from their own resources and without outside financial aid. The scientific exhibit was in charge of Dr. Walter L. Bruetsch.

The following exhibits were presented: Encephalitis. The United States Public Health Service, Washington, D. C.; The Horsley-Clarke Instrument and Some of the Results Obtained By Its Use. S. W. Ranson, M. D., Institute of Neurology, Northwestern University Medical School, Chicago, Ill.; Community Psychiatry. Groves B. Smith, M. D., Beverly Farm, Godfrey, Ill.; Syphilis and Epilepsy. Max A. Bahr, M. D., and Walter L. Bruetsch, M. D., Central State Hospital, Indianapolis, Ind.; The Age-Incidence Principle of Investigation in Relation to the Problems of Human Fitness or Constitution. William W. Graves, M. D., St. Louis University School of Medicine, St. Louis, Mo.; The Autonomic Nervous System. Albert Kuntz, M. D., St. Louis University School of Medicine, St. Louis, Mo.; Studies in Carbohydrate Metabolism in Patients Suffering from Convulsive Seizures. G. O. Broun, M. D., and James J. Del Vecchio, M. D., Department of Internal Medicine, St. Louis University School of Medicine, St. Louis, Mo.; The Preparation and Properties of Estrogenic Compounds. S. A. Thayer, B. S., Ph. D., and E. A. Doisy, M. S., Ph. D., Department of Biochemistry, St. Louis University School of Medicine, St. Louis, Mo.; Brain Lesion—to Bring Out Mental Functions Connected with the Left Base. Leland B. Alford, M. D., St. Louis, Mo.; Cystometer in the Diagnosis of Spinal Cord Lesions. D. K. Rose, M. D., Washington University School of Medicine, St. Louis, Mo.; Armamentarium for Testing Hearing in Neurological Cases. C. C. Bunch, Ph. D., Washington University School of Medicine, St. Louis, Mo.; Physical Exercise Therapy. Veterans Administration Facility, Perry Point, Md.; City of St. Louis, Department of Public Welfare, Hospital Division, Ralph M. Thompson, M. D.; The Tidal Drainage Apparatus. Frank M. Grogan, M. D., and Neil Moore, M. D., City Sanitarium, St. Louis, Mo.

On Wednesday and Thursday, May 6 and 7, motion pictures were exhibited depicting various mental hospital activities, with Dr. J. D. Reichard supervising the demonstrations. The following films were shown:

The Patient's Progress—Colorado Psychopathic Hospital, Denver, Colo.
The Rôle of the Danville State Hospital in Mental Hygiene, Danville, Pa.
Catatonia—St. Elizabeths Hospital, Washington, D. C.
Neurological Complications—St. Elizabeths Hospital, Washington, D. C.
Activities of the Hastings State Hospital—Dr. Juul C. Nielson, Ingleside, Nebr.
The Signs of Manifestations of Organic and Functional Diseases of the Nervous System—Dr. J. D. Reichard, U. S. P. H., Ellis Island, N. Y.
Treatment at the Marcy State Hospital, Marcy, N. Y.

Located also on the mezzanine corridor were extensive commercial exhibits of particular interest and value both to clinicians and mental hospital administrators.

There were a number of special events of interest to the Association. The American Association on Mental Deficiency held its sixteenth annual meeting at the New Hotel Jefferson, May 1 to 4.

Under the joint auspices of the Missouri Society for Mental Hygiene and the St. Louis Medical Society, there was a public meeting in the auditorium of the Medical Society Building Sunday afternoon, May 3, at which the President-elect, Dr. Campbell, spoke. On the evening of Tuesday, May 5, a similar meeting was held at the same auditorium by the St. Louis Medical Society at which President Cheney, Dr. Meyer, Dr. Menninger and Dr. Myerson participated. Following this meeting music was furnished and refreshments were served by the Women's Auxiliary.

Mr. Adolphus Busch, III, President of the Anheuser-Busch, Inc., graciously entertained the members at a buffet luncheon at the Bevo Plant.

Besides the above other special entertainment features were provided for the ladies, including sight-seeing trips to various points of interest in and about St. Louis.

The annual dinner was held in the ballroom of the New Hotel Jefferson on Wednesday evening, May 6, there being present 456 members and guests. C. Judson Herrick, Sc. D., Ph. D., Professor Emeritus, University of Chicago, delivered the Annual Address on "Control of Behavior; Its Mechanism and Evolution." Following the address, Dr. Adolf Meyer expressed the Association's appreciation of Dr. Herrick's contribution.

By invitation, Dr. R. Emmit Kane of St. Louis then eloquently spoke of the accomplishments of the late distinguished member of the Association, Dr. Malcolm Bliss, announcing that a new hospital in St. Louis will be named The Malcolm Bliss Psychopathic Hospital. By resolution of those present, the Secretary was instructed to express to the Honorable Bernard F. Dickman, Mayor of St. Louis, the appreciation of the Association of this tribute to the memory of Dr. Bliss.

There followed a most enjoyable period of entertainment consisting of vocal selections by the Washington University Glee Club under the able direction of Mr. Clay Ballew; and a presentation of "Mrs. Fitzmaurice and Her Mechanical Wax Works" by members of the Women's Auxiliary to the St. Louis Medical Society, directed by Dr. Helen Gibson. Dancing until 2 a. m. followed the musical and dramatic entertainments.

On Thursday evening, May 7, 325 members and guests attended the 14 Round Table discussions.

In accordance with the report of the Board of Examiners and upon recommendation of the Council, the Association elected Dr. Sigmund Freud, Vienna, honorary member; Dr. W. Clifford M. Scott, London, England, corresponding member; 19 members were made fellows; 98 applicants were elected members; 21 elected associate members.

The Constitution and By-laws of the Association were amended in accordance with previous announcements in the JOURNAL.

The following officers were elected for 1936-1937:

President: C. Macfie Campbell, M. D., Boston, Mass.
President-Elect: Ross McC. Chapman, M. D., Towson, Md.
Secretary-Treasurer: William C. Sandy, M. D., Harrisburg, Pa.
For Councillors: For one year, replacing Dr. Kirby, deceased, A. A. Brill, M. D., New York. For three years: Clarence O. Cheney, M. D., New York; Samuel W. Hamilton, M. D., White Plains, N. Y.; William D. Partlow, M. D., Tuscaloosa, Ala.; and C. M. Hincks, M. D., New York City and Toronto, Canada.
Max A. Bahr, M. D., Indianapolis, Ind., was elected Auditor for three years.

The section on Convulsive Disorders elected as Chairman Stanley Cobb, M. D., Massachusetts and S. Bernard Wortis, M. D., New York as Secretary; the section on Forensic Psychiatry, V. C. Branham, M. D., New York, as Chairman, and Leroy M. A.

Maeder, M. D., Pennsylvania, as Secretary; the section on Psychoanalysis continued Richard H. Hutchings, M. D., New York, as Chairman, and Nolan D. C. Lewis, M. D., New York, as Secretary; the section on Mental Deficiency continued Robert H. Haskell, M. D., Michigan, as Chairman and Oscar J. Raeder, M. D., Massachusetts, as Secretary.

The Association voted to hold the 93d annual meeting in 1937 in Pittsburgh, Pa., the exact time to be decided later by the Executive Committee.

The total registration was 884, of which 367 were members, representing 44 states, the District of Columbia and Canada.

WILLIAM C. SANDY, M. D., *Secretary.*

BLOOMINGDALE HOSPITAL BECOMES THE NEW YORK HOSPITAL, WESTCHESTER DIVISION.—The Governors of the Society of the New York Hospital announce that the name of Bloomingdale Hospital at White Plains, of which Dr. Clarence O. Cheney is now medical director, has been changed to New York Hospital, Westchester Division. This change is made in order to express in a clear and definite way the relationship of this hospital to the Society by which it has been conducted since it was established in 1821. This seems especially desirable at the present time because of the great progress in the psychiatric work of the Society at White Plains and the closer relations with the New York Hospital at 525 East 68th Street, New York City, by the establishment there of the Payne Whitney Psychiatric Clinic.

THE JULIUS ROSENWALD FUND AND MEDICAL ECONOMICS.—At the regular spring meetings of the Julius Rosenwald Fund early in May the important topic of medical economics received special consideration. The trustees expressed gratification in the work already accomplished, and their desire that programs in this field be carried forward effectively. During the past year plans for making medical care more available to people of small means have grown substantially, through the support of the Fund and its cooperation with other agencies. Voluntary insurance to lower the cost of hospital care—group hospitalization—has doubled, now covering some 350,000 persons with plans being established monthly

in new communities. A recent publication of the Fund described new plans for securing general medical care on a group payment or insurance basis, conducted in many parts of the United States by industrial agencies, cooperative societies, groups of physicians and medical societies and benefiting several million people. The Fund will continue to assist in the extension of the insurance principle in relation to hospital service, in scientific studies concerning the cost and the organization of medical care and in the education of qualified personnel for studying and administering hospitals and clinics.

First International Conference on Fever Therapy.—This first international meeting will be held at Columbia University, New York City, September 29 to October 3, 1936. Artificial fever as a therapeutic measure has been widely used in recent years in a variety of conditions. Five national conferences for the collection and comparison of data and the evaluation of results have been held in the United States since 1931 when the first conference was held at Rochester University Medical School.

This first international conference will be under the chairmanship of Baron Henri de Rothschild, Paris, France. The French Committee includes Professors d'Arsonval, Abrami, Alajouanine, Binet, Claude, Janet, Lardennois, Laubry and Levaditi. Other European Committees will be represented by Professors Maranon of Spain, Frugoni of Italy, Volhardt of Germany, Wagner-Jauregg, and Eppinger of Austria, Michaux of Switzerland, Bessemans of Belgium, and Danielopolu of Roumania.

The American Committee consists of Drs. Desjardins, Bierman, Hartman, Hinsie, Neymann, Simpson and Warren.

Abstracts of the papers read will be published in the volume of the transactions in English, German and French.

Information regarding this conference may be obtained from the general secretary, Dr. William Bierman, 471 Park Avenue, New York City.

Diplomates of the American Board of Psychiatry and Neurology.—At the May meetings of the Board held in St. Louis diplomas were issued for the following candidates.

CERTIFIED ON RECORD—CLASS I.

Neurology and Psychiatry.

Buckley, Albert C.....Frankford, Philadelphia, Pa.
Collier, George Kirby.....Rochester, N. Y.
Coriat, Isador H.....Boston, Mass.
Durgin, Delmer Dennis.....Central Islip, N. Y.
Favill, John .....Chicago, Ill.
Hodskins, Morgan Brewster.....Palmer, Mass.
Margaretten, Isidore .....New York City.
Masters, Howard Russell.....Richmond, Va.
Owensby, Newdigate Morland.....Atlanta, Ga.
Patten, Clarence Anderson.....Philadelphia, Pa.
Rabiner, Abraham Max.....Brooklyn, N. Y.
Schilder, Paul Ferdinand.....New York City.
Settle, George Meade.....Baltimore, Md.
Skoog, Andrew Leonard.....Kansas City, Mo.
Smith, Joseph .....Brooklyn, N. Y.
Spear, Irving J.....Baltimore, Md.
Terrill, James Joshua.....Dallas, Tex.
Weinberg, Max H.....Pittsburgh, Pa.
Witt, Guy Ferguson.....Dallas, Tex.
Young, William Walter.....Atlanta, Ga.

Psychiatry.

Ball, Arthur Nelson.....Northampton, Mass.
Bridgman, Olga Louise.....San Francisco, Calif.
Castner, Charles Whitfield.....Wichita Falls, Tex.
Connely, Edmund McCollam.....New Orleans, La.
Eirley, Clara S.....Logansport, Ind.
Eyman, Elmer Vail.....Philadelphia, Pa.
Freeman, George Herman.....St. Peter, Minn.
Gaunt, George Arthur.....Brookline, Mass.
Jameison, Gerald Reid.....New York City.
Kardiner, Abram .....New York City.
LaMoure, Charles TenEyck.....Mansfield Depot, Conn.
Lehrman, Philip Raphael.....New York, N. Y.
Levy, David M.....New York, N. Y.
McPherson, George E.....Belchertown, Mass.
Moyle, Henry Brown.....Hartford, Conn.
Myers, Glenn E.....Los Angeles, Calif.
Noble, Mary Gill.....Mattapan, Mass.
Thompson, Lloyd James.....Durham, N. C.
Treadway, Walter Lewis.....Washington, D. C.
Watkins, Harvey .....Polk, Pa.

NEUROLOGY.

Leak, Roy L.....Middletown, Conn.
Thompson, Charles Edward.....East Gardner, Mass.
Wood, W. Franklin.....Waverley, Mass.

CERTIFIED AFTER EXAMINATION—(CLASS II).

PSYCHIATRY.

Anderson, Forrest Nelson.....Los Angeles, Calif.
Barnacle, Clarke Horace.....Denver, Colo.
Billings, Edward G.....Denver, Colo.
Roth, William F., Jr.....Franklin, Tenn.
Rymer, Charles A.....Denver, Colo.
Wall, James Hardin.....White Plains, N. Y.
Williams, Clifford Leland.....Logansport, Ind.
Yakovlev, Paul Ivan.....Palmer, Mass.

PSYCHIATRY AND NEUROLOGY.

Bender, Lauretta .....New York City.
Bruetsch, Walter L.....Indianapolis, Ind.
Cooper, Melbourne John.....San Antonio, Tex.
Curran, Frank J.....New York City.
Fetterman, Joseph L.....Cleveland, Ohio.
Finesinger, Jacob Ellis.....Boston, Mass.
Hauser, A. .....Houston, Tex.
Malamud, William .....Iowa City, Iowa.
Moore, Merrill .....Boston, Mass.
Nichols, Ira C.....Providence, R. I.
Watters, Theodore A.....New Orleans, La.

NEUROLOGY.

Daniels, Luman E.....Denver, Colo.
Voris, Harold Cornelius.....Chicago, Ill.
Masten, Mabel Garden.....Madison, Wis.

A list of diplomates previously certified by the American Board of Psychiatry and Neurology was published in the March 1936 number of the JOURNAL.

NINTH INTERNATIONAL CONGRESS ON PHILOSOPHY.—Announcement has been made that the ninth International Congress on Philosophy will be held in Paris, August 1 to 6, 1937. This Congress, which normally meets once in four years, held its last session in Prague in 1934 when it was decided to shorten the next interval

to three years, designating the meeting of 1937 the *Congrès Descartes* in order to celebrate the tercentenary of the *Discours de la Méthode*.

The French Committee on Organization having in mind the Cartesian image of the "tree" of philosophy has endeavored to develop a program to illustrate the unity of method in the various fields of human inquiry. This problem, which was the theme of Descartes, will be the central one of the Congress, raising as it does the question what is the nature and what is the value of reason, since method is nothing else than reason in action.

It is proposed that the following topics shall be discussed in the Congress:

(1) The present status of Cartesian studies.
(2) The unity of science: *la Méthode* and methods. History of the problem and its present status.
(3) Logic and mathematics.
(4) Causality and determination in physics and biology. Probability and statistics.
(5) Reflective analysis of transcendence: the idea of the soul; the soul and the body; the soul and God.
(6) Value, norms (logical, moral, legal, æsthetic) and reality.

Contributions to this Congress, which may be written in English, German, French and Italian, and which should not exceed 2500 words, must be in the hands of the Secretary by February 1, 1937.

The fee for registration of active members is 80 francs. They may take part in the program, and will receive copies of the published proceedings. Associate members who may enjoy all of the privileges of the Congress save the two preceding, will pay 40 francs for registration. It is announced that among these privileges will be complimentary admission throughout the Congress to the International Exposition, which is held in Paris at this time.

Honorary president of the International Congress is M. Henri Bergson of the French Academy. The president of the Committee on Organization is Professor Émile Bréhier, 40, rue de l'Yvette, Paris (16e), to whom all communications should be addressed.

POSTPONEMENT OF INTERNATIONAL CONGRESS ON PSYCHOLOGY. —The eleventh International Congress, which was to have been held in Madrid during September of the present year, as announced

in the March issue of this JOURNAL, has been postponed until July 1937, the exact date to be announced later.

Dr. José Germain, general secretary of the Congress, announces that this change has been decided upon in view of the international situation, and also because of the fact that the second International Congress on Mental Hygiene will take place in Paris in July 1937, and the ninth International Congress on Philosophy at the beginning of August; and the postponed date will permit attendance at the various Congresses.

SCIENTIFIC EXHIBIT AT THE ANNUAL MEETING IN PITTSBURGH IN 1937.—There will be a scientific exhibit at the next annual meeting of The American Psychiatric Association. The following topics for the purpose of general orientation are suggested: Interesting material relating to neuropathology, neuroanatomy, new laboratory procedures, clinical psychiatry, mental hygiene, child guidance, diagnostic methods, statistical researches, etc.

Important aids toward a successful scientific exhibit are personal demonstration; plainly lettered posters; statement of purpose or justification of exhibit; and neatness and care in planning material. The scientific exhibit offers an opportunity for investigators and visiting members to meet and discuss informally the various phases of the research work presented. The exhibit is also of special advantage to persons reading papers since the exhibit can be used to supplement the paper read. Application for space with a short description of the exhibit material, not exceeding 150 words, should be submitted to the Director of the Scientific Exhibit, Dr. Walter L. Bruetsch, Central State Hospital, Indianapolis, Indiana, not later than March 1, 1937.

COMMITTEE FOR THE STUDY OF SUICIDE.—Announcement is made of the incorporation of the Committee for the Study of Suicide, with the following officers: Dr. Gerald R. Jameison, President, Mr. Marshall Field, Vice-President, Dr. Henry Alsop Riley, Treasurer, Dr. Gregory Zilboorg, Secretary and Director of Research, and Miss Elizabeth G. Brockett and Drs. Franklin G. Ebaugh, Herman Newberg, Dudley D. Shoenfeld and Bettina Warburg, members.

The committee plans a comprehensive study of suicide as a social and psychological phenomenon, and has projected five lines of inquiry: 1. *Intramural Studies* in selected mental hospitals with special reference to therapy and prevention; 2. *Extramural Studies* with similar objectives in certain out-patient clinics; 3. *Social Studies* in which the social background and history of persons attempting suicide will be investigated with the help of psychiatric social workers; 4. *Ethnological Studies* to be carried on in the field and dealing with suicidal tendencies among primitive races; 5. *Historical Studies* to provide a body of information concerning the history of suicide.

Dr. Henry E. Sigerist, Professor of the History of Medicine, Johns Hopkins University, and Dr. Edward Sapir, Professor of Anthropology, Yale University, are consultant members of the committee.

The committee may be addressed at Room 1404, Medical Arts Center, 57 West 57th St., New York City.

Book Reviews.

THE CEREBROSPINAL FLUID AND ITS RELATION TO THE BLOOD. By *Solomon Katzenelbogen, M. D.* (Baltimore: The Johns Hopkins Press, 1935.)

This is an extensive survey of the work which has been done on the constituents of the cerebrospinal fluid and the ratio of the level of these constituents to their counterparts in the blood. The data include statistics for normal individuals and patients suffering from various diseases. The reader will find this survey of value, together with the results of the author's own work.

The review of the origin, formation and circulation of the spinal fluid provides many key references with brief remarks concerning the work quoted. The lack is felt of illustrations portraying the anatomy and histology of the choriod plexus, ventricular system, arachnoid villi and the like. Similarly one feels that in a work of this caliber, greater space might well have been devoted to the anatomical problems underlying the circulation and absorption of the cerebrospinal fluid. The author does not take a strong stand for or against extra-ventricular production of cerebrospinal fluid as a factor influencing the level of constituents of the cerebrospinal fluid. In discussing the mode of formation of cerebrospinal fluid by the choroid plexus, he considers that the term "physiological or biological permeability" adequately expresses his point of view. The conception embraces dialysis and a varying degree of physiological activity of the cells of the choroid plexus.

The summary at the end of many of the chapters is a definite assistance to the reader and affords a useful contrast to the many opinions quoted in the text. A full and excellent bibliography completes the book. Typographical errors occur in both text and bibliography.

This book may well be drawn to the attention of internist, neurologist and psychiatrist for the many valuable references it contains, and as a source of information upon the constituents of "The Cerebrospinal Fluid and its Relation to the Blood."

C. H. BEST, M. D.,
University of Toronto.

CAN DELINQUENCY BE MEASURED? By *Sophia Moses Robinson.* (New York: Columbia University Press, 1936.)

A rather astonishing announcement has been widely distributed preceding the publication of this book. We were told that its appeal would be wide—to the taxpayer, the Sunday school worker, the teacher and all sorts of people who were in practical contacts with delinquents. The fact of the matter is that the author presents a highly critical study of data relating to possible differences of rates of delinquency in varying urban areas and indeed to the whole concept of delinquency itself. Many questions are raised which, as the

author says, cannot be answered. What one group of people in our midst consider delinquency is not necessarily reckoned as delinquency in another group. The resources for taking care of early manifestations of delinquency mean little. But practically all of this was already known to workers in the field, at least to those who had their eyes open. What Mrs. Robinson has done is to buttress by ample figures (including 75 tables) what was already evident. She wisely concludes that no delinquency index for areas or national groups is feasible from any figures that are available. She is highly critical of the well-known areal indices of delinquency promulgated by Shaw and his colleagues in Chicago. The conclusions drawn from the studies in Chicago and other cities she believes do not apply at all to New York. The book itself is mainly of local interest because her research is almost entirely based upon New York figures. A short chapter of conclusions simply brings up other questions which are not pointed at all in the direction of psychiatric work.

For a review in this JOURNAL one may appreciatively quote the following: "In fact, since overt behavior is often only a symptom of underlying difficulty, study reveals not only a combination of symptoms but a not too authoritative connection between the original symptom and the real problem." In the book there is little of interest for psychiatrists except the main thesis which is that it is entirely unsafe to use terms loosely and to draw conclusions concerning correlations of delinquency with social data that are handed out to us in the form of statistics. The sociological statisticians, however, have something to chew over.

WILLIAM HEALY, M. D.,
Boston.

DESTINY AND DISEASE IN MENTAL DISORDERS. By *Charles Macfie Campbell, M. D.* (New York: W. W. Norton & Company, Inc., 1935.)

This book by Dr. Campbell is most useful. It is an excellent idea that the Thomas W. Salmon Memorial Lectures should be published in book form.

The discussion in the first chapter of trends in psychiatry leads up from the idea of humane treatment for the mentally ill, which was brought about in the nineteenth century through the classification of mental illnesses on a basis similar to that used in general medicine, to the use of knowledge of anatomy, physiology and endocrinology and general research. However, the author says that these latter methods still leave alarming gaps in our knowledge, and it is questionable whether the following of diagnostic terms is very useful. Dr. Campbell refers to the steadying influence in American psychiatry of Dr. Adolf Meyer who "emphasized the necessity in the study of patients of taking into account not only the somatic functions but also the more specifically human functions, of taking account of the way in which the individual actually deals with the concrete problems of life"; or, as Dr. Campbell says, "the individual case has to be studied as an example of human nature in difficulty and in this there is no justification for confining oneself to physiological categories." The influences of Jung and Freud are noted in relation to current psychiatric thought. The emphasis in modern psychiatry is upon the study of the human personality, and anyone familiar with Dr.

Campbell's teaching realizes the wisdom of his emphasis upon the "total personality." There are various interesting points taken from our knowledge of the individual in industry, of the individual in the home and in college, of the individual in ordinary illness and in other everyday situations which lead us to see where Dr. Campbell gets his idea of destiny in mental illness. There is nothing pessimistic about this first chapter.

With this emphasis on the individual Dr. Campbell has given short pen pictures of some 44 patients or thereabouts whose behavior showed various forms of poor adaptation or in some cases lack of adaptation. It is interesting reading. It is the more interesting because it is based upon facts, and it is encouraging. Certainly it shatters some of the older ideas about schizophrenia.

In the final chapter the discussion of some general principles and particular symptoms "to illustrate how the general trends of psychiatry outlined in the first lecture converge upon the particular problems of the second lecture" tends to unify the series. Dr. Campbell's point of view seems clear in this utterance. "One may seem to be a disturber of the peace if one reject familiar diagnostic terms, and if one insist that more important than the formal diagnosis of the case is its formulation in terms of the familiar forces of human life, based on the painstaking dynamic analysis of the patient and his relation to the environment."

These lectures are challenging and are productive of thought, and we recommend their careful perusal.

E. P. Lewis, M. D.,
Toronto.

A Textbook of Psychiatry. By *Arthur P. Noyes, M.D.* (New York: The MacMillan Company, 1936.)

This interesting and well-written book is the second edition of Dr. Noyes' text-book for nurses. He deals with his subject from a distinctly mental hygiene standpoint, and its application is not confined to any one group of nurses. The following are samples of the general viewpoint:

"Mental health is a relative matter, and our unwholesome methods of adjusting to the problems of our inner lives merge imperceptibly into those which we call mental disease. For this reason the nurse should understand and seek to develop not only in her own life, but in the lives of her patients, those mental habits which are essential for a happy, wholesome, adjusted personality—in other words, promote mental hygiene. Psychiatric nursing should not be concerned solely or even largely with outspoken mental disorder. Most unhealthy mental processes do not lead to the serious mental disorders encountered in psychiatric hospitals. Like physical illness, mental disorders may be mild, but in these mild forms, persons unacquainted with psychiatric principles often fail to recognize that the less obvious manifestations are the result of the same personality difficulties and of the same mental processes, as are the serious disorders. The point of view promoted by psychiatry more than by any other branch of nursing tends to make the nurse realize that her professional task is to nurse human beings, not diseases; also that fully effec-

tive medical and nursing care cannot be given a patient unless any mental and emotional difficulties that exist are understood."

The material of the book is arranged in much the usual order. An introductory division on "Mind, Its Development and Purpose," "Motivating Sources of Behavior," "Conscious and Unconscious Mental Processes," etc., leads up to a discussion of the various mental disabilities. These are all dealt with as problems in adjustment. The psychosis is regarded as an unsuccessful method of dealing with the patient's particular problem which leads to personality disturbances. At the close of each such study is a section entitled "Nursing Care and Management." While this volume does not call itself a textbook of nursing, these sections nevertheless contain much practical nursing advice, and are very valuable. The nursing care is taken up in a particularly helpful way—the way in which the physician can most assist the nurse by pointing out the significant things to be observed and recorded; and by outlining the principles underlying his treatment plan, and the practical psychotherapy indicated. Less time is spent than is sometimes the case in pointing out the necessity for the nurse possessing all the rarer and more difficult virtues, and more emphasis is laid on understanding of the patient and intelligent cooperation with the physician.

Following this, valuable chapters on "Psychiatric Nursing," and "The Nurse and Her Profession," summarize many of the principles formulated in the previous chapters. Emphasis is placed upon the nurse's opportunity for interpreting the function and aims of the mental institution to the public, as represented by the relatives and friends of the patients. The fact is stressed again that all nursing has psychiatric aspects, and some of the personality adjustments of the nurse herself, particularly in a hospital situation are discussed. "It is encouraging to note that the policies of such institutions tend to become less paternalistic, and now grant the nurse greater freedom in the regulation of her personal affairs." Many regulations, however, must remain as necessary safeguards, and to counteract the institutionalizing effect of this, the nurse should seek wholesome social interests.

The section on "Mental Hygiene" states that "There is a hygiene of the personality as well as of the body—mental health and efficient life adjustment require that thinking be rational, emotions be untroubled, and strivings be harmonious." The nurse in private duty or public health has access to homes in a way that places her, if psychiatrically trained, in a peculiarly strategic position to teach the principles of mental health. For this reason she requires also a knowledge of the causes of delinquency and crime, of industrial and economic maladjustment. There is then a general discussion of the mental hygiene of childhood, and, more briefly, that of adult life. The author concludes: "The message of mental hygiene is for all who have difficulties to face, for the child and for the adult, for the delinquent and for him who works for social betterment, for the sane and for the psychotic. It seeks to strengthen the personality equipment of the individual, and to promote the health and happiness of the race. An understanding of the forces underlying human behavior should teach us how and why people fail in the process of adaptation, as well as why it behooves us not to be too captious of those who have not succeeded when called upon to face problems beyond their ability."

After reading this book, one is convinced that the author has had long and successful experience in teaching nurses, and in observing the practical results. Taken in all, it would seem that this book is an important addition to the available texts for teaching nursing.

N. D. FIDLER, Reg. N.,
Toronto.

A GUIDE TO PSYCHIATRIC NURSING. By *F. A. Carmichael, M. D.*, and *John Chapman, M. A., M. D.* (Philadelphia: Lea & Febiger, 1936.)

This brief work was originally compiled as a handbook for nurses in the Osawatomie State Hospital. This is the second edition, enlarged and illustrated.

The authors state that their purpose is not "to produce merely another summary of mental and nervous diseases," but that they desire chiefly to emphasize the importance of observation of the objective behavior of patients. "What we wish to impress on nurses is the value of accurate and detailed observation. The purpose is to present as simply as possible the deviations in conduct, not as psychiatric mechanisms, but as ward behavior." To aid in giving this viewpoint, they append an original classification of mental disease, based on physiological activity, as opposed to attempts at emotional interpretation.

The book gives a brief outline of the history of psychiatry, followed by several chapters of definitions and classifications of mental diseases, their pathology, etiology and symptomatology. Further chapters are devoted to outlines of the chief symptoms of the common diseases. This section of the book furnishes a brief but clear and practical guide to assist the nurse in understanding her patients.

The parts of the book directly relating to the nurses' work might be more positive in their approach. Only one chapter is devoted to the treatment of mental disease, and of this, one page is given to "mental therapy," the greater part of the material being outlines of certain physical procedures. The chapter on "The Ethics and Duties of Psychiatric Nursing," while stressing the central importance of the patient and other fundamental points, seems to dwell unduly on certain abuses which one hopes have almost ceased to exist. Definite suggestions as to how to make her relationship to the patient therapeutic would perhaps have been more challenging to the nurse.

N. D. FIDLER, Reg. N.,
Toronto.

CHILD PSYCHIATRY. By *Leo Kanner, M. D.* (Springfield: Chas. C. Thomas, 1935.)

The organization of this book is important. A brief but weighty consideration of different "schools" and current theories in child psychiatry leads to a longer description of the author's (Meyerian) pluralistic psychobiology. Then come chapters on the examination and treatment of the child, his family,

and his more general environment. The book ends with studies of the personality difficulties which come from or with physical illnesses, which are expressed chiefly in terms relating to some body system, or which are expressed generally.

The thoroughness of the author is remarkable. In text and footnotes he considers five or six hundred other writers on children's problems, who have almost that many different points of view. And the author has brought a remarkable unity into these complexities. Judged for its comprehensiveness, its practicality, its clearness, no other book will take its place for some time, and no other book will so well explain child psychiatry to the pediatrician and the general practitioner. It is an organization of common sense.

Deep therapy, child guidance clinics and social workers, do not make much of an appearance in this book. The reviewer is inclined to think that the absence is understandable—they cannot be fitted into such a survey as the author has carried out.

EARL D. BOND, M. D.,
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GENIE UND IRRSINN IM UNGARISCHEN GEISTESLEBEN. By *H. von Szirmay-Pulszky*. (Munich: Ernst Reinhardt, 1935.)

The interest in the relationship between genius and insanity is never waning and many theories on the subject have been advanced. A relatively recent and one time very popular theory was that of Lombroso, according to which genius is a form of a psychosis. This theory, as many other of Lombroso's concepts, concerning criminality, for instance, have been given up in favor of the modern pathographic science. Pathography became quite popular in the last fifty years. Its development is an outgrowth of psychoanalysis of Freud and of the characterological studies of Kretschmer. Discounting the fictionized biography there are pathographies in which hundreds of famous men and women have received a scientific psychiatric scrutiny. As a result of these studies a system has grown up which combines all the natural sciences such as psychology, characterology, and medicine. It can be rightfully said that Freud and Kretschmer were responsible for this new discipline and credit must go especially to Kretschmer for the impetus he gave to the study of the character traits of the foremost world personalities. Of course, the cyclothymic and the schizothymic types were already known and were recognized long before these terms were coined by Kretschmer. The corpulent, rotund man and the petite plump woman have always personified the good-natured and jolly personalities, while the devil and the witch in the folklore are the angular and haggard looking individuals. We find these types in the pre-analytic and the pre-Kretschmer literature and they probably served as prototypes of the later scientific characterological types. There is, for instance, Cervantes' immortal uncompromising idealist, the haggard knight, Don Quixote, and the fat and jolly Falstaff on the opposite end. More recently, particularly Lange-Eichbaum added to the advancement of pathobiography with his studies "Genius, Insanity, and Fame" and "Genius and Fame." Lange-Eichbaum

claims that there is a statistically proven frequency relationship between genius and insanity and more specifically between high talent and tendency to mental and nervous disorders.

Von Szirmay-Pulszky, an admirer of Lange-Eichbaum, presents in the present volume a pathographic study of Hungarian poets, statesmen, painters, and of a few scientists. Some of his biographic sketches offer a wealth of psychiatric material. Only the limitations of a review restrain us from citing case records. Von Szirmay-Pulszky reviews the Hungarian cultural life to prove the accuracy of Lange-Eichbaum's theories. He feels that the frequency relationship between talent and psychopathy or the genius *anlage* and psychosis is particularly demonstrated in the case of the famous mathematician Johann Bolyai. This case as well as that of Count Stefan Széchenyi seem to emphasize the accuracy of Kretschmer's schizothymic and cyclothymic types. One, the greatest Hungarian scientist, whose discoveries were in the field of abstract theoretical mathematics, was a schizoid psychopath and later a schizophrenic, while the other, a leader in practical statescraft and politics, who exercised his greatest cultural influence in the field of every-day practical life, was a neurotic character who finally went into a manic-depressive psychosis. One was an idealist with schizothymic tendencies, the other was an energetic, agitating and practical man of the cyclothymic type. This objectively demonstrable relationship between the genius *anlage* and psychopathy is traced by the author in a number of Hungarian poets such as Balassa, Csokonai, Berzsenyi, Vörömarty, Petófi, Arani, and others. Szirmay-Pulszky emphasizes the biologic and sociologic implications in the genius-insanity relationship, a view which has already been advocated by Lange-Eichbaum. The underlying forces of the emotional pattern give the stamp of the genius; these are the forces which mold the life of the highly endowed in such a manner as to create the impression of something unusual, of "something especial and overwhelming." The author uses the development of the Hungarian cultural life to prove the sociological origin of genius. This book offers a study in dynamics of genius. As such it is carried out along the lines laid down by Freud, Kretschmer and Lange-Eichbaum. Here we found a scientific substantiation of Kretschmer's types and of Reibmayrs' theories of the heredobiological postulates of genius.

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Lehrbuch der Nerven- und Geisteskrankheiten. By *Prof. W. Weygandt* with the collaboration of *Professors Gruhle, Kehrer, Kihn, Meggendorfer, Rittershaus, Rosenfeld, Scholz, Stertz, Veraguth, Walter.* (Halle: Carl Marhold Verlagsbuchhandlung, 1935.)

States Prof. Ernst Rüdin as an opening word to this volume: "A textbook for students and physicians, which deals with the diseases of the whole central nervous system, and which in the exposition of causal factors does adequate justice to modern genealogical research and its implications for human beings, was an urgent need of our time."

And that is exactly what has been done. The essentials of neurology and psychiatry are here united in a systematic presentation in a convenient, stoutly bound 663 page volume, only an inch and a quarter thick, which opens easily, offers clear readable pages and contains 210 illustrations. The bound volume sells for 27 Reichmarks.

In so distinctive an undertaking it is desirable to survey the plan of the work. A detailed 15 page table of contents facilitates reference to any required section or topic.

There is first the usual "general" section occupying roughly one-third of the text and containing the following chapters: 1. The Causes of Mental and Nervous Diseases; 2a. Bodily Symptoms in Nervous and Mental Diseases; 2b. Biological Symptomatology; 2c. Psychopathology; 3. Pathological Anatomy of the Central Nervous System; 4. Diagnosis and Prognosis; 5. Treatment of Nervous and Mental Diseases; 6. Forensic Psychiatry.

The divisions of the clinical section are: 1. Diseases of the Peripheral Nerves; 2. Diseases of the Vegetative Nervous System; 3. Diseases of the Spinal Cord; 4a. Focal Lesions of the Brain; 4b. Diseases of the Meninges; 4c. Extrapyramidal Diseases; 4d. Luigenic Diseases of the Nervous System and of the Psyche; 4e. Diseases of the Involution Period and Senium; 5. Developmental Disturbances of the Psyche and of the Nervous System in Childhood; 6a. Schizophrenia; 6b. Manic-depressive Psychosis; 7a. Exogenic Intoxications and Infections; 7b. Nervous and Mental Diseases extraneous to European Culture, especially in the Tropics; 8. Mental and Nervous Disorders with Organic Diseases and Autotoxic Conditions, including Endocrine Disturbances; 9. Epilepsy; 10. Psychopathic Conditions; 11. Abnormal Reactions, the Neuroses; 12. Sexualpathology.

As Prof. Weygandt points out separate textbooks of neurology and psychiatry hitherto have customarily devoted considerable space to discussion of the same diseases, such as organic brain conditions, brain syphilis and paresis, arteriosclerosis, encephalitis, many endocrine disorders, epilepsy, hysteria and the great mass of so-called psychoneuroses. In the present combined work this duplication, and the consequent dispute about overlapping fields, is avoided.

The book takes account of modern social views, and lays full emphasis upon the manifold social aspects of mental disturbances which in this respect have always been distinguished from most of the physical diseases.

In view of the present official attitude of Germany on the subject of race hygiene, the discussions of etiology and treatment, especially prevention, are of primary interest. The legislation of July 14, 1933, for the prevention of the transmission of hereditary disease is referred to very briefly. This act provides for the voluntary or compulsory surgical sterilization of persons afflicted with hereditary disease if according to the experience of medical science there is great probability that their offspring will suffer from severe hereditary physical or mental disorders. The following conditions are so designated under the law: 1. congenital mental defect, 2. schizophrenia, 3. manic-depressive psychosis, 4. hereditary epilepsy, 5. Huntington's chorea, 6. hereditary

blindness, 7. hereditary deafness, 8. severe hereditary physical malformations. Severe alcoholism may also be included.

While outside of Germany the views of Rüdin and his school with respect to the inheritance of mental disease may be regarded as extreme, nevertheless his pioneer work in this field must command great respect; and while the drastic German law of 1933 has not met with approval elsewhere, nevertheless these circumstances do not detract from the significance of heredity as the fundamental and indispensable factor in the physical and mental constitution of the individual. In the section on Etiology (Meggendorfer) there is noticeable stress on the comparative frequency of mental disturbances among the Jews, and upon the alleged ill-effects of racial mixture. In discussing prevention, Weygandt, who for many years has urged legislation based on heredo-biological considerations, estimates that legal sterilizations in Germany will exceed 400,000, mental defectives accounting for about half this number, schizophrenics 80,000, epileptics 60,000, manic-depressives 20,000, alcoholics 10,000, Huntington's chorea 900. He believes however that the figures, especially for the defectives and schizophrenics will be considerably higher. Under treatment Weygandt gives a survey, necessarily brief, of psychotherapeutic measures past and present, making mention of Mesmer, Braid, Liébault, Charcot, Bernheim, Janet, Breuer, Freud, Jung, Adler, Dubois, J. H. Schultz, and finally the occupational therapy of Simon. Weygandt's discussion of psychoanalysis concludes: "So anfechtbar die theoretischen Grundlangen also sind, so fragwürdig sind auch die Heilerfolge, trotzdem das langwierige Verfahren viele Patienten geradezu zu Hörigen des Arztes machte, um so für jahrelang wilderholte Sitzungen schwere Opfer zu bringen."

In many parts of the work one would like to see longer expositions, but it must be said that a tremendous amount of information has been compressed into a relatively small textbook of great value and which represents a long step in advance in presenting the diseases of the nervous system and of the personality.

C. B. F.

In Memoriam.

CHARLES SHERMAN LITTLE.

1869–1936.

Charles Sherman Little was born in the town of Webster, New Hampshire, on February 12, 1869. The old homestead on Little Hill looks off the north to Mount Kearsage and to the east across the valley of the Blackwater River. A mile or less down a country road running between hedge rows, open fields and dense woods, stands the little country school house he attended as a boy. Born of stern New England stock and reared on the rugged hill top farm, industry, determination and an indomitable courage were inculcated in his personality at an early age.

He entered the Dow Academy at Franconia, New Hampshire, and after a period of four years there he matriculated at Dartmouth. At Dartmouth the same qualities which in after years made it possible for him to bring to completion Letchworth Village, brought him fame as one of Dartmouth's football stars. Whether it was crashing through the centre of the line as " Squash " Little in the eighteen nineties or cutting directly through governmental red tape in the nineteen tens and twenties, the same honesty of purpose, directness of approach and the will to win were there. He never carried the ball around the end of the line or resorted to trick plays.

He received his Bachelor's Degree from Dartmouth in 1891 and and after a period of two years during which time he worked as a surveyor's assistant, he returned to Dartmouth to study medicine receiving his degree of Doctor of Medicine in 1896.

Like many others, his entrance into institutional medicine was a matter of economic necessity and not a matter of choice. How fortunate this enforced step in his career was to the State of New Hampshire and the Empire State is attested in silent tribute by the Laconia State School and Letchworth Village. After a period of two years at Tewksbury State Hospital in Massachusetts, he entered the field of psychiatry at Taunton State Hospital where he met Dr. Tertia Claire Wilton whom he married in 1902 and by whom he had two children, Barbara and Sherman.

Mrs. Little died on October 25, 1913. Dr. Little was remarried on July 16, 1919, to Daphne Perkins of Moore's Corners, Massachusetts. After a year at Taunton, he became a member of the staff of McLean Hospital in Waverley, Massachusetts, where he spent five years as an associate of the late August Hoch.

In 1902 he was selected by the State of New Hampshire on the recommendation of the late Walter E. Fernald to build and organize an institution for mental defectives at Laconia. A detailed account of his Laconia period would again reflect Dr. Little's rugged determination as well as that other side of him, his love for and devotion to people. He was beloved by the populace of the surrounding countryside as well as by the employees with whom he worked shoulder to shoulder in those pioneering days.

On July 1, 1910, he was appointed Superintendent of Letchworth Village. This was not the Letchworth Village we know today. It was then a collection of adjacent farms and rocky mountain land, devoid of any modern conveniences; and again the spirit of the early American pioneer in Charles S. Little came to the fore. For the first several months he lived in a shack, familiarized himself with the lay of the land, and planned an entire institution for over 3000 inmates, before a single building was constructed. How well he planned is attested by the Letchworth Village of 1936. The site of each building and the general principles of architectural design and construction were determined by Dr. Little in those early months and as time went on and building after building was erected, not a single major deviation from the original plan was necessary. Those earlier years were beset with what would seem to us insurmountable difficulties, but Dr. Little won through by his oneness of purpose and dogged persistence. He encountered a stubborn opposition to his Letchworth plan. How he met this is best illustrated in his own words—"As long as I am Superintendent, the only buildings that will go up here are those that I want. If buildings of another type are wanted, you will have to get another Superintendent, but I am not going to resign; you will have to fire me."

To those who worked at Letchworth and were members of the staff, Dr. Little was always the Superintendent, but a kind of Superintendent we worked with rather than for. Beneath his rugged exterior was a heart of gold and no one except those

closest to him knew of the helping hand he lent to those in sickness, trouble and ill fortune.

On July 19, 1918, he entered the military service during the World War, serving in the Medical Corps in this country and in France. Again he was soon recognized for his organizing and executive ability and was promoted to the rank of Major.

On July 1, 1935, a group of Dr. Little's friends and admirers gathered to celebrate his 25th anniversary as Superintendent of Letchworth Village. The tributes paid to him on this occasion reflect the love, respect and admiration engendered in those who knew him by his simplicity, honesty of purpose and courageous endeavors and accomplishments.

It was a satisfaction to his friends and admirers, perhaps more so than to Dr. Little himself, that Dartmouth College, his Alma Mater, took cognizance of his achievements and conferred upon him the honorary degree of Doctor of Science on June 20, 1933. President Hopkins of Dartmouth College in awarding the degree to Dr. Little, spoke as follows:

> Graduate of Dartmouth in 1891. Outstanding leader in the betterment of conditions for handicapped groups of humanity; reticent in expression of the creative instinct which is yours and diffident in the presence of appreciation of this; humble in spirit, but forceful in action; with no thought of seeking for it, you have won public confidence and the respect and esteem of professional associates. Reared in the rugged school where successful achievement was contingent upon long hours and arduous toil, you have been an exponent of the Apostle's injunction to endure hardness. Distinguished in the years of your athletic career for sportsmanship in games, you have applied this principle to conditions of life. You have made unfortunates of less privilege and those of undeveloped minds your special responsibility; you have taught society to understand the needs of these and to make provision for them; and always in care of them you have proved yourself a master in planning and a genius in administration. I confer upon you the honorary degree of Doctor of Science.

Dr. Little died of coronary sclerosis on June 6, 1936, in the midst of an active life, as was his expressed wish. He had lived to see the fulfillment of his dream of 1910. Letchworth Village and what it is, a home, a school and a laboratory, stands as an enduring symbol of his spirit. He was truly a great man and the lives of many are richer for having had the rare privilege of knowing him.

HOWARD W. POTTER.